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S&T POST

SPACE as a driver of development

Diwata-1 now in orbit

Meet PEDRO, Diwata's other half

INTO SPACE

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EDITORIAL

Believe

One of our weakest suits as a people, perhaps, is being non-believer of our own potentials. Surprisingly, this belief is put to a test in some of our culturally amazing practices that showcase "oneness" in special events such as beauty contents, boxing, and basketball.

Surprisingly, however, there is the outpour of good tidings and words of encouragements for the Diwata- 1 project and to the people behind its success. Naturally, there will always be birth pains. And while, the Philippine science community is ecstatic for this feat, Philippine mythology reminds us that the term diwata, a type of deity or spirit, was derived from the Sanskrit devata and from the Spanish encantada.

What is probably not yet realized by most is the fact that this initiative signals the start of the Philippines' space program. It actually opens indefinite possibilities for our potential as a people. Through this, the DOST has proven its mettle that we can go beyond our perceived limit as a nation.

The Department says that the potential uses of Diwata, the first all-Filipino assembled microsatellite, include the following: improved weather detection and forecasts, disaster risk management, detecting agricultural growth patterns, and the monitoring of forest cover, mining, protection of cultural and historical sites, and the territorial borders of the Philippines.

This is the country's first microsatellite designed, developed, and assembled by Filipino researchers and engineers under the guidance of Japanese experts from Hokkaido University and Tohoku University.

The satellite is designed to provide real-time images for disaster risk management and other applications. Seven engineering students from the University of the Philippines and two science researchers from DOST's Advanced Science and Technology Institute were sent to Tohoku University and Hokkaido University in Japan to work on the microsatellite bus system and payload design while pursuing advanced degrees, as part of the PHL-MICROSAT program.Part of the three-year program is the development of a second microsatellite (Diwata-2) to be launched in 2017.

Unknown to many, the rest of the PHL-MICROSAT team at UP Diliman are developing a ground receiving station that will allow space borne images to be transmitted to earth. It will also be used to transmit commands from the ground to the microsatellite to carry out its mission effectively.

According to the DOST's Philippine Council for Industry, Energy and Emerging Technology Research and Development, the office monitoring the project, "Diwata-1 is a low earth orbit satellite set to fly 400km above the earth. It serves as a training platform and will pave the way for the Filipino team to further develop their skills in space technology. Diwata will be sending vital images and data back to Philippine Earth Data Resources and Observation Center which was set up to receive data from the satellite."

What is to be understood is that more than the capabilities of Diwata is our innate strength of surmounting trials and tribulations. The microsatellite may have a gamut of uses, but what truly manifests in this undertaking is our desire as a people to achieve greatness and the power to believe in our innate skills and capabilities.

Aristotle P. Carandang, PhD

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Science and Technology Information Institute-DOST (Library)
DOST STARBOOKS

papi

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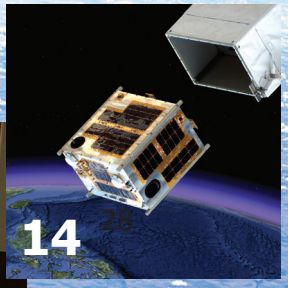

OUR COVER

The creation of Diwata-1 and its subsequent launch into orbit are landmarks in the history of the Philippines. The country's first microsatellite, Diwata-1 is designed and assembled by a team of nine young Filipino engineers and physicists under the tutelage of Filipino and Japanese professors. Thus Diwata-1 is another testament of the Pinoy's capability to develop its own technology that works, and can even be launched INTO SPACE.

DOST NEWS

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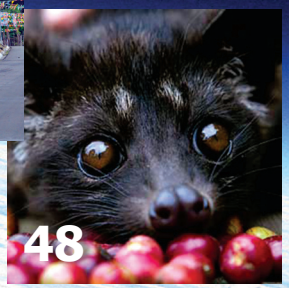
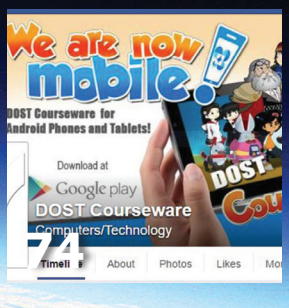




Expert urges use of local scientists' studies for reclamation policies

By FATIMA M. MONCADA
S&T Media Service, *DOST-STII*

THE PHILIPPINES has its own Environmental Impact System and policies for reclamation projects in place but Dr. Kelvin S. Rodolfo, corresponding member of the National Academy of Science and Technology (NAST), believes that these can be better implemented if the government will tap local scientists. NAST is an attached agency of the Department of Science and Technology (DOST).

In a NAST-organized policy discussion held recently at Hotel Jen in Pasay City, Dr. Rodolfo proposed that rather than employing foreign consultants in feasibility assessments of reclamation projects in the country, Filipino scientists should instead be prioritized especially for projects ran by the government. He lamented that though Philippine science is done well by Filipino scientists, they are "ignored and foreign consultants are instead used."

According to Dr. Rodolfo, the current practice is that feasibility assessments offered by international non-profit organizations such as the Japan International Cooperation Agency (JICA) are used because they are free. Rodolfo pointed out that there are already a number of local scientific researches that assessed the viability of reclamation in various areas of the country.

Dr. Ely Anthony Ouano, former director of the Environmental Management Bureau who also delivered a lecture on the Environmental Impact Assessment and its Use in Decision Making, said in an open forum that foreign-aided government projects are lawfully open for bidding to foreign consultants. And since organizations like JICA are offering free services, they are the ones who are usually chosen for feasibility assessments.

However, there are instances when projects are declared feasible despite the hazards and risks identified by separate studies done by Filipino experts.

Architect Felino "Jun" A. Palafox, Jr. of Palafox Architecture Group, Inc. related his experience during the conception of the 1976-1977 Metro Manila Plan (MMETROPLAN), a comprehensive urban plan for the country's capital. In his discussion on the advantages and disadvantages of reclamation, he mentioned that one of his recommendations regarding the Manila Bay area was that "No further developments shall be done beyond what was already reclaimed in 1976 until comprehensive detailed planning socio-economic, financial, engineering studies, etc. are done in the wider urban context of Manila Metropolitan region."

Academician Fernando Siringan explained in his introductory discussion that two factors should be considered in planning for reclamation, namely relative sea level rise and coastal erosion. Both phenomena, according to Dr. Rodolfo, are affecting the Manila Bay area negatively. This means that the sea level is continuously rising and the soil along the shore is further subsiding, making the area a hazardous site for reclamation. Additionally, the Manila Bay shore has a soft slope that makes the area more vulnerable to storm surges.

Nevertheless, 40 years since Arch. Palafox's 1976 MMETROPLAN recommendation, a number of reclamation projects had already been completed along the Manila Bay.

Arch. Palafox, however, recognized that reclamation can in fact be beneficial to the Philippines. "A properly planned, designed, engineered, and implemented reclamation area can do the country a lot of good if done properly in the right place, at the right time, at the right land-use, type, and density, and correct comprehensive planning and development," he said.

The challenge then, according to Dr. Rodolfo, is for the government to recognize the studies made by Filipino scientists so that the country can avoid facing catastrophes caused by the improper implementation of reclamation.

Architect Felino "Jun" A. Palafox Jr. of Palafox Architecture Group, Inc. shares his experience as a consultant for the development of Metro Manila Plan 1976-1977 which included reclamation plans for Manila Bay.

Dr. Kelvin S. Rodolfo, corresponding member of the DOST-National Academy of Science and Technology, discusses how Philippine science produced by Filipino scientists can aid in the enhancement of reclamation policies in the country.

Maborrang leads DOST Region 02

By DOST II
S&T Media Service

SANCHO A. Maborrang may not have a "Doctor" before his name, but that may not be needed because he is an engineer whose credentials can never be questioned.

Maborrang is now the full-fledged Director of the Department of Science and Technology (DOST) Region 02 Office that has jurisdiction over Cagayan Valley. He succeeded an equally competent public servant in Dr. Urduja A. Tejada who is now the DOST Assistant Secretary for Countryside Development.

He took his oath of office as full-fledged head of the DOST Region 02 Office on March 7, 2016 before Science and Technology Secretary Mario G. Montejo.

Born on December 23, 1968, he obtained his BS Civil Engineering degree from the Far Eastern University in 1991.

He went on to pursue post-graduate studies in Belgium. From September 1994 to July 1995, he took his Complementary Studies in Post-Harvest Engineering, and from September 1995 to September 1997, his M.S. Post-Harvest Engineering, at the Katholieke Universiteit Leuven in Belgium. He graduated Cum Laude in MS Post-Harvest Engineering.

He also had his training in Technology Needs Assessment from August – September 2003 at the Swinburne University, Australia, and Non-Destructive Testing Trainer's Training in September 2006 in Seoul, South Korea.

Maborrang also attended numerous trainings, seminars, conferences, workshops and short training courses from 1992 up to 2015 - many of which were held abroad.

To date, he has written the following publications/articles:

- "Postharvest Evaluation of Mango *(Mangifera indica L.)* in Key Areas of the Philippines" – Leuven Belgium, September 1997

- "Technology Needs Assessment Manual" – Swinburne University, Australia, July 2004

- Non-Destructive Testing: Philippine Situationer, Kaeri, South Korea, 2006

With his impressive educational credentials, it is no wonder Maborrang has received numerous awards during his tenure with the DOST:

- 2011 Outstanding PSTD - National Awardee
- 2011 Outstanding DOST R02 Personnel of the Year
- 2010 Outstanding DOST R02 Personnel of the Year
- 2009 Outstanding DOST R02 Personnel of the Year
- Best Technical Services Division Staff – December 2008
- Outstanding Performance as Coordinator of Coco HIP CVHRDC, CVIERDEC and CVARRD, 2007-2008
- Civil Service PAG-ASA Award (Group Category) September 1993.

He is also a member of the following organizations:

- Science & Technology Advisory Council (Belgium Chapter)
- KOICA Alumni Association (Philippine Chapter)
- Free & Accepted Masons/Grand Lodge of the Philippines, Itawes Lodge #215, Piat, Cagayan
- Philippine Game Fishing Foundation Inc. (PGFFI)
- Philippine Chamber of Commerce & Industry, Cagayan Chapter, 2007-2008

Maborrang has also been invited numerous times as resource person and even trainor in various conferences, seminars and workshops, both here and abroad.

His better half is Victoria Babaran-Maborrang, concurrently Senior Science Research Specialist at DOST Region 02 office. Their child is Via Beatrice B. Mabborang.

Now that DOST Region 02 office is led by Maborrang, it is expected to become an even more active catalyst that will promote inclusive growth in the Cagayan Valley, driven by Science and Technology. Truly, a maverick now leads DOST Region 02 office!

Techie with a Purpose

Meet Mr. Richard Pomar Burgos, STII's new Director

By ESPIE ANGELICA A. DE LEON
S&T Media Service, *DOST-STII*

"We should be at the forefront, using available technologies and platforms that will help us deliver on our mandates better."

"ARE WE friends on Facebook?" he casually asked each one of us.

Somebody replied, rather sheepishly, "No." Without batting an eyelash, he asked again, "Why not?"

Such is Science and Technology Information Institute (STII) Director Richard Pomar Burgos' fixation on social media, or technology in general. Yet no, it is not mere fixation; rather, it is an affirmation of how important technology is to him.

"Everything's here," he said, referring to the typical modern-day gadget. "It does away with clutter, it simplifies things. This is really the way we should be moving forward."

Indeed, as the newly installed top man of DOST's information arm, Burgos is currently studying the Institute's work processes and meeting small teams among its staff in the process. When he discusses the improvements he wants to incorporate, his heavy reliance on technology is palpable.

First of all, he is batting for outsourcing the monitoring and evaluation of DOST's media coverage to enhance service delivery and better engage scarce human resources. He prefers reports via email for easy access and retrieval, breaking down space and time barriers.

Second, he is excited about pushing STARBOOKS and sharing STII's digital information collection particularly to underserved sectors. He looks forward to the challenges of running DOSTv which, he said, is his first marching order.

"A weather broadcast program will provide us a platform of our own that we can manage and organize, to ensure that our news items really go out.," he said. "STII is in a really good position right now. We should potentialize DOSTv. And I think this is where we should be seeing convergence – not just broadcast media, but even social media."

For this end, he said he has been talking to industry people who are experienced in harnessing social media, and who can help run DOSTv.

Also, he mentioned the need to establish an office communication system that uses many platforms for collaboration, including virtual meetings. Plus, he is also pushing for the improvement of STII's library services.

"We should be at the forefront, using available technologies and platforms that will help us deliver on our mandates better," he stated. "We should be visible, searchable. To maximize search engine optimization techniques, we should know how to use hashtags, keywords, and things like that."

Certainly his stints in the IT industry contributed to this IT-oriented mindset. He worked in three companies within a span of 13 years: Philippine Systems Products Inc., Hewlett-Packard, and IBM.

Not only did he learn to embrace technology during this time; he also learned certain management practices in the private sector which he wants to apply in government.

One of these is the implementation of an open door policy. "Why would you stop people from talking to you?" he asked.

Another thing he learned is management by walking around the office to talk to the staff, see them at work, and know them better. A third one is accountability. Yet another is innovation, which he learned from IBM in particular. "If you want different results, you have to do different things," he explained. "If you do the same things predictably, the same results you will get. So, innovation."

It was IBM which also introduced him to the concept of career self-reliance. "I

wouldn't tell you [STII staff] 'take this course, that course.' You be the master of your career. Now to make yourself competitive in this world, you have to be different. You have to create value added," he elaborated.

From the IT industry, he jumped ship and joined Enchanted Kingdom to, in his own words, "magbenta ng aliw (sell entertainment)." STII could learn a lot from the retail and entertainment industry, according to Burgos. "Selling experiences is the transaction that would create value added to any organization that is selling anything. Experience sells." And then he fired the question, "When they come to STII, what will they experience?" He paused and then said, as if on cue, "I need you to create that experience."

Before his foray into the IT industry, Burgos worked as a Spanish teacher at the University of Bacolod in '83, landed a job in '86 at DOST-PCAARRD's Office of the Executive Director where he wrote speeches and helped plan activities, and subsequently became chief of staff of DOST Sec. William Padolina.

He was also based in Hyderabad, India, from 2012 to 2015 as chief of staff of the Director General of International Crops Research Institute for the Semi-arid Tropics (ICRISAT), Dr. William Dar. "After serving 2 Williams, and imbibing a lot of leadership, communications and organizational skills, I felt it was time to come home and serve the country and our people," he added.

The techie is also a tour guide

He is also into conducting heritage tours around the Philippines and not surprisingly, he taps social media to organize such tours at least once every quarter. He brings the day tours to Angono, Antipolo, Angeles among others, but the most popular is the Hot Air Balloon Festival tour in Pampanga which appeals strongly to the youth.

Thanks to social media, he can quickly organize and promote these tours. "I have gained new friends, people that I wouldn't normally meet in my line of work because of this avocation," he shared. "It keeps me rooted and proud to share the best of our history and culture."

Aside from organizing tours, he also watches football, posts regularly in his FB account, and is amazed by You Tube. He regrets not having enough time to read unlike when he was younger. As a child growing up in Negros, he would take a trip to the city library once a week to borrow books. He considers the reading experience as a form of vicarious learning and a great way to fire off the imagination.

"There's so much to learn. Of course now I'm happy to see that with IT, we have many things at our fingertips literally." And these "many things at our fingertips" that he mentioned do not only include information that we can learn; it also includes information that we can bring to our audience.

"Today, with 80% of all the available information residing in computers and storage areas or devices, we have an obligation to bring them out and make them more useful," he stated. "That is the heart of the mission of STII from my perspective. "

Indeed, at this juncture, STII opens up a new chapter – a chapter that will hopefully see an Institute well grounded on technology to make S&T information useful and available to all sectors of Philippine society.

"Dr. Follosco's dedication when it comes to public service can't be measured. His passion, knowledge, and expertise became so valuable to improve the lives of many Filipinos through Science and Technology."

- William G. Padolina, *former DOST Secretary and current president of National Academy of Science and Technology.*

Acd. Follosco: A great public servant and mentor in the world of S&T

By ALLAN MAURO V. MARFAL
S&T Media Service, *DOST-STII*

KNOWN FOR his commitment to public service and his huge contribution to the development of Science and Technology, former Department of Science and Technology (DOST) Secretary Dr. Ceferino Follosco will undoubtedly leave a big footprint in the local S&T community.

"Dr. Follosco's dedication when it comes to public service can't be measured. His passion, knowledge, and expertise became so valuable to improve the lives of many Filipinos through Science and Technology, said former DOST Secretary and current president of National Academy of Science and Technology William G. Padolina.

Meanwhile, former director of DOST's Industrial Technology Development Institute (ITDI) Nuna Almanzor described Dr. Follosco as a great leader who motivates you to reach your fullest potential.

"He (Dr. Follosco) is always willing to guide you so that you would appreciate your contributions to the country much better. I will really miss you, Sir, because you had been an inspiration every time you will talk to me. You always say, be proud, be consistent, and your commitment because it is science and technology that will take us to national environment," she told in her eulogy during Dr. Follosco's wake.

She described the former DOST chief as "a boss who is caring and so loving."

Great Works and achievements

Born on February 3, 1931 in Lanao Del Sur, Follosco was a man of varied expertise who had graduate degrees in mechanical, electrical, agricultural, and management engineering. He also served as the chairman of the Science and Technology Coordinating Council created under AO 123, and directed the formulation of Action Plans and Implementing Programs for the leading edges.

He was also an industrialist; he began his career at the G.A. Machineries as a service engineer before being promoted to division head of manufacturing machineries and assembly of tractors and vehicles. He also developed different types of agricultural machinery, especially lowland equipment. From 1969-1975, he worked for Ford Philippines as vice president for manufacturing and headed a team that produced the first Asian Utility Vehicle, the "Ford Fiera."

Dr. Follosco became the secretary of DOST from 1989 to 1992. Under his term, he implemented the modernization strategy for the country's industrial and agricultural systems through the adoption of "leading edge technologies," including the election of sectors on the basis of potentials in terms of increased production, increased value added, and capacity to expand local production.

Aside from that he was also the one who drew the comprehensive Science and Technology Master Plan focusing on three major strategies: a) modernization of the production sector through massive technology transfers; b) upgrading of R&D activities; and c) development of infrastructures, institution building, manpower development, and development of S&T culture.

Programs that he had created under the STMP include Comprehensive Technology Transfer Program, Manufacturing Productivity Extension for export modernization, and Technology Business Incubators. The inclusion of S&T Parks, Technology Incubators, and R&D activities in the government's Investment Priorities Plan were also done under his term.

The National Academy of Science and Technology (NAST) granted the title of Academician to Follosco in 2001 for his outstanding achievements in the field of agricultural mechanization and automotive engineering. He was the chairman of the Engineering Sciences and Technology Division of NAST.

Reaching for the stars

The Philippines will soon have its very own satellite in space. What's in it for us?

By ROGEL MARI SESE
UP-Los Baños

Dr. Sese is having fun with zero gravity inside the Kibo Module of the International Space Station.

Last Jan. 13, the Diwata-1 microsatellite was officially turned over to the Japan Aerospace Exploration Agency (JAXA) in preparation for its scheduled launch in March this year. The event marks an important milestone in Philippine history as it is the first micro-satellite built by Filipino scientists and engineers and signifies the country's first step toward a self-reliant space development program.

Not everyone was celebrating though. Some Filipinos were questioning why our country invested P800 million for microsatellites when we had more immediate and large-scale problems to solve— poverty, economic growth, and national security. Is a national space program truly necessary or were we literally reaching for the stars?

Since the dawn of time, space has always been a source of fascination and inquiry, challenging mankind to discover and explore the Earth and, to a greater extent, the Universe. Space research and development have produced numerous practical benefits—oftentimes, without us being aware of it—that enabled mankind to elevate its state of living and increase survivability over time.

Space technology has now become ubiquitous, regarded as an indispensable asset of modern society. Like water and energy, space systems and products have become embedded in our modern societies that their benefits go largely unnoticed, except when they fail to function as expected.

Many satellites nowadays are being used for both military and peaceful applications, demonstrating that space systems are dual-use technologies. Geostationary satellites can provide constant communication links for the whole Philippine archipelago, especially remote areas and territorial boundaries.

Complementarily, Earth observation satellites in low-Earth orbit can provide accurate images of the Earth's surface, thereby increasing our understanding of the various meteorological and

geological processes affecting our planet, making weather forecasting much easier and faster, and making climate research possible. It also allows the detection of pollution levels as well as the ability to monitor forests, seas, mountains, and other resources.

In times of natural disasters, these satellites can provide imagery and communications necessary for disaster assessment, response, and recovery, thus resulting in faster response times and better, more accurate, hazard mapping that can help save millions of lives and billions worth of property.

Satellites can also provide data for mapping, spatial information services for proper land use and resources management for various applications such as to increase rice productivity through precision agriculture. This means food security for the country through more efficient crop and fishing monitoring/management. Satellites can even help alleviate traffic by providing vehicles with satellite navigation.

But more than these obvious uses, a national space program benefits the country in ways that has nothing to do with a satellite's practical applications. A space program can lead to the creation of new technologies and applications, human resources capacity-building, and the development of science education and industry. It brings about, for instance, an awareness of the value of science and technology among the younger generation and the general public.

With astronaut Akihiko Hoshide (Photos from Dr. Sese's Facebook page)

The development of a local space industry can directly and indirectly provide high-tech, high-paying jobs to Filipinos together with the growth of supporting industries. Best of all, it gives the country pride and confidence that we can keep up, and eventually compete, with our ASEAN neighbors.

With all these applications and gains, a national space program will prove to be something that can benefit us in the long term. Through continued government and private support, it should contribute to national development and, in the future, become a vital and worthwhile component necessary to the growth of the Philippines.

Financially, a space program is not as impractical as it appears. A recent cost-benefit analysis study showed that every P1 invested by the Philippines in a national space program translates to an average return of P2.5 in cost savings based on infrastructure investments alone. This does not even include numerous unquantifiable benefits that can help improve the country.

In terms of budget, the country needs to invest at least P2.5 billion annually for a civilian space program. For the 19 million taxpayers in the country, this amounts to only P132 million annually or P11 monthly per taxpayer. With this amount, the Philippines can already create a pool of local space experts, establish a local space industry, and develop at least five satellites in the next 10 years, capable of providing secure communications link and satellite imagery for various civilian and military applications.

Don't you think P11—the price of a small pack of potato chips, around two to three cigarette sticks, a soft drink—per month is a small price to pay to push the Philippines into the space age and toward exploring the Earth and the Universe?

One of only three astrophysicists in the Philippines, Dr. Rogel Mari Sese is the project leader of the National SPACE Development Program under the Philippine Council for Industry, Energy and Emerging Technology Research and Development of the Department of Science and Technology. He also serves as the focal person for the Philippine Space Science Education Program of the Science Education Institute of the DOST.

(Note: This article was first published at the Panorama Magazine of the Manila Bulletin and at http://www.mb.com.ph/reaching-for-the-stars/#5oSqfhlsSRGEOd1q.99)

Space usually connotes nothingness or something beyond ordinary mortals, depending on how the term is used. But in science and technology, space is something that triggers creativity leading to development.

Space as a driver of development

By CLAIRE M. REYES
S&T Media Service, *DOST-PCIEERD*

Did you know that the most popular technologies we enjoy today are offshoots of earlier technologies developed for outer space? We find them all around-- medical technologies, automobile system, cellphone camera, improved weather forecasting and navigation and long-term storage of critical supplies like oxygen, hydrogen, food and biological samples, among others.

Space technologies, despite the "out there" notion, actually touches on almost all aspects of development including agriculture, global health, environment, disasters, education, communication, transportation, and international peace and security.

Thus commercial space activities have been recognized to play a very important role in expanding the use of outer space and stimulating space activities for the benefit of humanity. To develop such activities, there have to be legal frameworks, funding, adequate human resources, education and training, and certification or standards.

Sustaining space activities

To sustain the development of commercial space activities, the government and industries should develop long-term and inclusive relationships that enable efficient and transparent availability of funds for space activities. There is also a need to create awareness about space commerce and change the paradigm of government-driven space activities.

Likewise, we should forge partnership with other countries to maximize and increase the use of the International Space Station such as system and payload operations, astronaut activities, ISS sustainability, and common systems operation.

More human space exploration-related outreach activities involving general public stakeholders and decision makers should also be conducted. The United Nations will soon set up schemes for encouraging cooperation between space faring and developing countries in view of human space exploration. This will require an international framework that will allow citizens of developing countries to

participate in joint activities like human space flights.

DOST on Space Science

The Philippines through DOST shall seek partnership with other developing and developed countries to implement and oversee common programs. Dream Up for example offers partnership to help realize an educational community where space-based research and space-based projects will be available to all students, from primary to post-doctorate, to the ISS and beyond.

DOST shall further strengthen local capacity to use space science technology and applications by helping to integrate space capabilities into national development programs.

We can start by integrating into the educational curricula the space and microgravity science and providing government support for joint researches on the following emerging fields in space science and technology applications:

1. Space and Micro-gravity Science

This is being studied to learn what happens to people and equipment in space.

a. A remote-controlled miniaturized microgravity solution – small lab on a chip, e.g., miniaturization of microscope and PCR machine for biotech experiments in space

- stem cells in microgravity
- bacterial virulence in microgravity
- differential gene expression in microgravity
- improved shelf-life of colloidal-based products

b. Centrifugation for improving microgravity induced orthostatic tolerance

c. Stem cell study in microgravity

d. Production of biofuel in microgravity

2. Drop-test Experiments

A drop tower or tube is a structure used to produce a controlled period of weightlessness of an object under study. Air bags, polystyrene pellets, and magnetic or mechanical brakes are sometimes used to arrest the fall of the experimental payload. In other cases, high-speed impact with a substrate at the bottom of the tower is an intentional part of the experimental protocol.

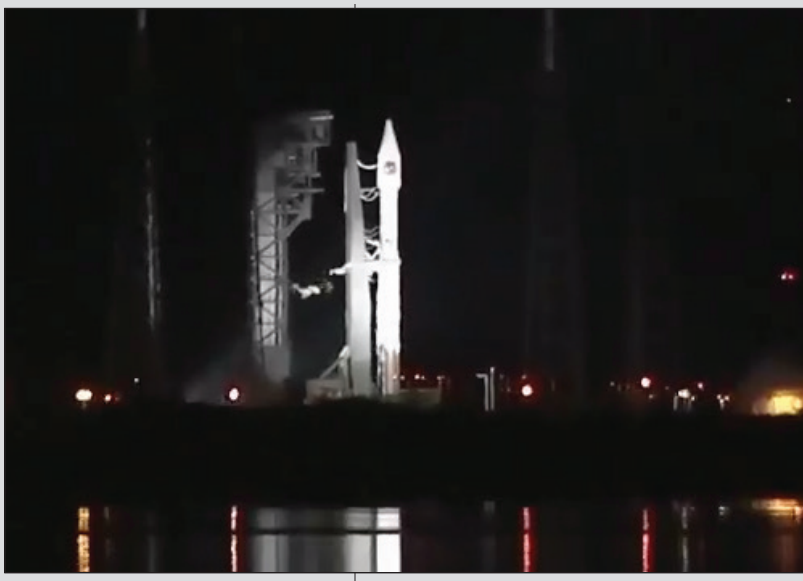
- Drop Towers in Bremen in Germany provide a relatively cheap alternative to space laboratories for conducting certain kinds of experiment.
- NASA Glenn's Zero Gravity Research Facility in the US is based on a vertical shaft, extending to 510 feet (155 m) below ground level.

3. NanoLab

This is a powerful box in the CubeSat form factor, measuring 10 cm by 10 cm by 10 cm. Every NanoLab has a circuit board that activates the experiment, turns it off and can be functioned for other activities. NanoLabs are plugged into our research platforms via a normal USB port, allowing data and power to flow. A single NanoLab is 1U in size. It allows the researcher to focus on the work without re-inventing the hardware "wheel" each time.

4. Robotics

The use of remote presence robotic technology to narrow



the gap of inequality in remote under-serviced locations, like DOST's RxBox. However, this one can perform urgent medical operations.

5. Cryogenic studies in space

It is the study of the production and behavior of materials at very low temperatures. Applications include biology, liquid, engine, electronics, fuel for rockets, etc. This enables human space flight, fundamental physics, and global monitoring.

6. Space Mineral Resources Study

7. High-Power Propulsion System

This is a steady state electric propulsion (solar or nuclear) that could bring humans to deep space. It uses plasma with no electrodes and occupies the high power niche needed for sustained human exploration.

8. Study of Cyanobacteria for Desertification Control

This is used in greening or re-greening of any dry land area due to desertification.

9. Aerospace engineering This entails research, design, manufacture, operation, and maintenance of spacecraft and its components.

10. Use of LIDAR, microsatellite data and other remote sensing data should be maximized for new emerging applications: health/disease mapping, exposure risk assessment, identification of evacuation areas, resource use allocation and management, sustainable farming, land cover classification and change detection, and post-disaster assessment and recovery.

11. Use of Unmanned Aerial Vehicle to complement satellite data for various applications

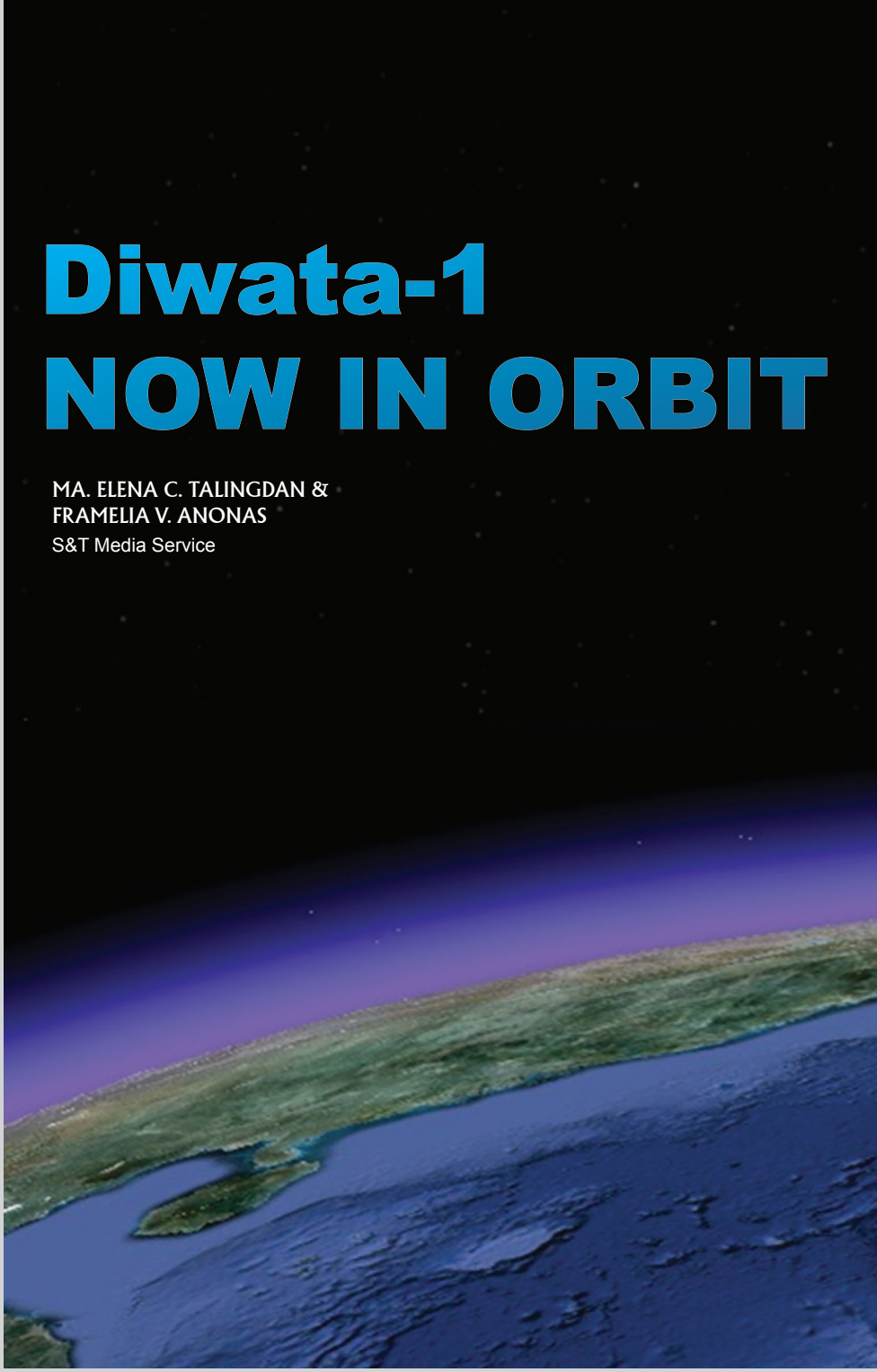
12. Remote Sensing should be used for Climate Change Mitigation Strategies like conservation, change in energy source, new technologies and innovations, more efficient disaster management and governance, geo-engineering, intergovernmental efforts and soil moisture monitoring, etc.

We need to further create awareness of the multifarious space benefits for humanity so that more people could be inspired to discover and innovate for present and future generations.

Diwata-1 NOW IN ORBIT

MA. ELENA C. TALINGDAN &
FRAMELIA V. ANONAS
S&T Media Service

Diwata-1, the first Philippine microsatellite, was launched from the International Space Station into space to start its mission on April 27, Wednesday, 7 PM (Philippine time) where it was watched live at youtube.com/user/jaxachannel. What is the meaning of all this to all Filipinos?



Diwata-1 was finally launched into orbit following its historical delivery last March 23 when it was set off from the National Aeronautics and Space Administration in Cape Canaveral, Florida to the International Space Station(ISS). The microsatellite was launched aboard the cargo spacecraft Cygnus.

The ISS, the largest artificial body in orbit and can often be seen with the naked eye from Earth, serves as a microgravity and space environment research laboratory in which crew members conduct various experiments.

According to the DOST- Philippine Council for Industry, Energy and Emerging Technology Research and Development, the microsatellite will be released by the JEM Small Satellite Orbital Deployer at 400 km above the earth's surface.

The deployment of Diwata-1 is historical not only for the Philippines but also for the National Research and Development Institute of Japan Aerospace Exploration Agency (JAXA) in Tsukuba Space Center.

According to JAXA, this is the first time for JAXA to launch a 50-kg class satellite from the Japanese Experiment Module (JEM) nicknamed "Kibo."

JAXA noted that "the deployment of the microsatellite combines the only air lock and robot arm in the ISS used in Kibo operations, which, in the future, is expected to be one of the important means to meet the launch needs of microsatellites."

Diwata-1's mission is to capture photos and images from its main payload consisting of high precision telescope, spaceborne multispectral imager, and wide field camera. The telescope produces high resolution imaging for observing large-scale weather patterns while the imager is used for monitoring bodies of water and vegetation. Meanwhile, the camera is used in observing large-scale weather patterns.

According to DOST Secretary Mario G. Montejo, Diwata-1 is historic as it is designed, developed, and assembled by Filipino scientists. Aside from the microsatellite's use in disaster-response mechanisms, agriculture, tourism, and others, it also marks a milestone in the country's developing space program and a testament that local scientists can make our own microsatellite.

Diwata is released aboard the cargo spacecraft Cygnus March 23 to dock at the International Space Station where the microsatellite will be calibrated for its voyage, Diwata will be launched into space in April to start its 20-month mission. Photo by Japan Aerospace Exploration Agency.

Meanwhile Philippine Ambassador to the United States Jose L. Cuisia, Jr. said that the launch of Diwata-1 is "not only a giant leap for Philippine science and technology. It could also provide Philippine policy makers with the scientific data and information needed to formulate policies relating to disaster mitigation, agricultural productivity, and management of land and water resources.

Diwata-1 is expected to be in orbit for approximately 20 months and will be imaging the country twice daily.

Along with the microsatellite development is the installation of the satellite ground receiving station called PEDRO or the Philippine Earth Data Resources Observation. Located in Subic, Zambales, PEDRO is tasked to receive DIiwata-1 imagery, including other images from selected commercial satellites.

Another space-related facility under construction is the UP Diliman Microsatellite Research and Instructional facility which will be the hub of training for future space technology research and development activities.

Diwatas 1 and 2, and the ground station called PEDRO are part of a three-year, P840.82-million microsat program.

Ground Receiving Station

PHL-Microsat antenna (Diwata 1 & 2)

Meet Pedro, Diwata's other half

By RODOLFO P. DE GUZMAN
S&T Media Services, *DOST-STII*

As Diwata works overhead, Pedro is always on the alert to receive all of Diwata's messages. Read about the noble relationship of Diwata and Pedro, one that is "made in heaven" for Pinoys.

As Diwata flies in the sky, "someone" watches under, receiving all her messages and storing them for various uses. It's some kind of a relationship - Pedro completes Diwata and the two are paired for a noble reason.

PEDRO, or the Philippine Earth Data Resource Observation Center , is one of the five components of the PHL-Microsat program. Headed by Alvin Retamar of DOST's Advanced Science and Technology Institute (DOST-ASTI), Pedro is the ground receiving station, a state-of-the-art communication facility based in Subic Bay Freeport Zone in Zambales province.

Pedro can be compared to a catcher in a baseball game, always ready to receive the fast ball of data and satellite images coming from Diwata- 1 at a speed of 2.4 Mbps. It is capable of receiving the 3,600 images per day from Diwata 1.

In Pedro, Filipino scientists and analysts will process the data to come up with various spatial data that will be useful for other government agencies like the Department of Environment and Natural Resources (DENR), Department of Agriculture (DA) and the Department of Defense, to name a few.

In more practical terms, the data generated from the microsatellite and fed to the ground station will be able to determine occurrence of pests, monitor agricultural yields of staple crops like rice to address shortages of supply.

Likewise this technology will aid the government in anticipating extreme weather events like drought. "The El Niño phenomenon was detected using remote sensing technologies," said Dr. Enrico Paringit of the National Engineering Center of the University of the Philippines Diliman College of Engineering.

"Diwata and Pedro are part of our commitment to improve the lives of Mang Juan and Aling Maria because the benefits we would gain from having our own microsatellites will trickle down to our farmers, fishermen, and other sectors of society to achieve food security, proper forest management, more accurate weather forecasting and heighten our disaster preparedness efforts to attain zero casualties during calamities; and this is what science and technology is all about," concluded DOST Secretary Mario G. Montejo.

The "Diwata" of Diwata

By FRAMELIA V. ANONAS
S&T Media Service, *DOST-STII*

The young Pinoys who designed and assembled Diwata. Photo by EDD K. USMAN.

The sole woman among the nine young engineers who painstakingly built Diwata under the guidance of Japanese mentors, Kaye Kristine Vergel proved her mettle as a Physics whiz whose Math acumen gave her the space to shine as one of the country's pioneers in microsatellite development.

"Like most kids, I dreamt of becoming a medical doctor. Growing up with a mom who's a nurse, I was inclined on joining the medical field," Kaye Kristine Vergel said. "I seriously considered this until I discovered my love for numbers and that I have seplophobia."

Seplophobia, or fear of decaying matters, may have driven her away from the medical field. But her love for numbers, or arithmophilia, tossed her into a field that is way beyond most of us—space.

Be it figurative or literal, Kaye earned her space through her acumen for numbers, and Physics for that matter.

Kaye is one of the nine young engineers who assembled Diwata-1. In fact, this spunky lady leads the Mission and Payload Team of PHL-Microsat.

While working on Diwata, she also has her hands full as a graduate student at the Department of Cosmoscience in Hokkaido University in Japan.

"My favorite subject was actually Math but since it is the language of Physics, I got hooked," she recalled. She said she got hooked on Physics when she was in high school.

"I love how everything in this world, from the colors of the sky to how my answers to these questions will travel from my laptop here in Japan to someone's computer in the Philippines, can be explained by Physics," she explained.

Making Diwata

Diwata-1 was assembled by nine young Pinoy engineers who were all graduate students including her. Their hard work which ate up most of their time, including school and personal time, has become legendary and served as inspiration to aspiring space technology researchers.

"The microsatellite has two main components, the bus and the payloads," she explained. "My colleagues in Tohoku University are in charge of the bus development, while here in Hokkaido University, we are in charge of the mission and payload development."

Kaye led Diwata's Mission and Payload team.

"In every satellite project, everything starts with the mission design which specifies the main scientific goals and products that should be achieved during the satellite's life span. Accordingly, the cameras or payloads are designed to be able to attain the mission requirements," she said.

Microsatellites are usually developed in three years. But the Diwata engineers made the country' first microsatellite in just a year.

"...We had a very short development time which was just a year. I think that was the biggest limitation," she admitted. "Because of this short development period, there's less room for mistakes. To make up for this, we really had to work extra hours. I remember that we had to work even on Christmas just to finish all the tests."

The sole woman

How did she feel about being the only woman in the group?

It is neither (an advantage nor disadvantage)," she said. "I never felt that I'm the only woman in the team. My colleagues are very easy to work with and gender is not really an issue."

After the long months of grueling hard work and sleepless nights, she said she felt "relieved" when Diwata finally made it to the International Space Station (ISS) after its launch into space on March 23.

After Diwata-1, the government will next launch Diwata-2 in 2017. "We are actually starting to work on the Diwta-2 microsatellite right now," she revealed.

Going back home

The two Diwatas, indeed, are quite demanding. Kaye intimates on her plan after working and studying in Japan: "I'm looking forward to coming home and hopefully working for the Philippines' own space agency."

"Personally, I'm looking forward to spending more time with my friends and family," she said.

This is really expected of someone like her who acknowledges her parents as the people who made the greatest influence on her.

"They are hardworking citizen and (while I was) growing-up I looked-up to them," she proudly said.

Are Filipinos really prepared for more, extreme disasters in the coming days? Romelie Janelle Maranan presents PHIL-LiDAR I, a mapping project that helps Pinoys prepare for disasters.

Are you mapped yet?

Disaster preparedness and mitiga

By ROMELIE JANELLE MARANAN
S&T Media Service, *DOST-STII*

Due to its location near the most active tropical cyclone basin in the Western Pacific, the Philippines tops the list of nations that are most vulnerable to the effects of climate change, most especially to frequent and more intense storms by 2013, according to the 2015 Global Climate Risk Index. These natural hazards, which are anticipated to worsen in the next days, have already resulted in widespread damages on properties and lives of every Filipino.

But despite surviving most of these catastrophes, areFilipinos really prepared for more, extreme disasters in the coming days?

While these disasters are inevitable, we can still mitigate their effects in our communities.

The Department of Science and Technology (DOST) recognizes this need in the national and local level and focused on using Light Detection and Ranging (LiDAR) in resource assessment and mapping.

To further improve the current approach in climate change mitigation and adaptation, the Philippine-Light Detection and Ranging I (PHIL-LiDAR I) was established in 2014.

Funded by DOST and implemented by the University of the Philippines Diliman through the Training Center for Applied Geodesy and Photogrammetry (UP-TCAGP), in partnership with 14 other state universities and colleges and private higher educational institutes, PHIL-LiDAR I is an offshoot of the UP Disaster Risk and Exposure Assessment for Mitigation (DREAM) LiDAR project. PHIL-LiDAR I aims to produce 3D flood hazard maps and river water level forecast system for 257 major rivers in the Philippines.

How the hazard maps are produced

The project uses the most advanced, state-of-the-art remote sensing technologies like the LiDAR and Synthetic Aperture Radar among others, to generate the needed maps. These fine scale mappings of flooding scenarios, on the other hand, will be created through the use of high-accuracy digital elevation models.

LiDAR technology involves the recording of laser pulses emitted across the earth's surface, particularly the time it takes for its return, and accurately calculating the distance between itself and the subject. Instruments that are needed for this technology include an airborne navigation vehicle (airplane or helicopter) to vessel the equipment; laser and scanner for surveying; sensor to record the time and; Global Positioning System and Inertial Navigation System for determining the absolute location and orientation of the instrument during the process. However, LiDAR images are still in raw form and need to be processed for flood and other hazards modeling.

More maps, please

The DREAM Program, the biggest of the nine components of the Project Nationwide Operational Assessment of Hazards (NOAH) was formed in 2011 and has already accomplished its target to provide flood hazards and early warning system to 18 major river systems in the country. Since this only covers 1/3 of the Philippine river system, PHIL-LiDAR I will be covering the remaining 2/3.

Acquiring earth surface height data through remote sensing (the science of obtaining information about objects from afar), typically from aircrafts or satellites, has been a major factor in most geospatial-planning strategies and most often used for flood risk modeling and urban development.

The PHIL-LiDAR I Project is divided into two sub-programs, namely Program A: Data Acquisition, Integration, Archiving, Distribution and Capacity Building; and Program B: LiDAR Data Processing and Validation by SUCs and HEIs in Luzon, Visayas, and Mindanao.

Program A, implemented by UP-TCAGP and headed by Dr. Enrico C. Paringit, is composed of six component projects:

- LiDAR Data Acquisition for the Hazard Mapping of the Philippines (DAC) led by Engr. Czar Jakiri Sarmiento
- LiDAR Data Validation and Bathymetry Component (DVBC) led by Prof. Louie Balicanta
- LiDAR Calibration, Point Cloud Classification, and Image Orthorectification (DPPC) led by Engr. Rosario Concepcion Ang
- Integrating High-Resolution Digital Elevation Models (DEM) into GIS-based Flood Modeling (FMC) led by Dr. Alfredo Mahar Francisco A. Lagmay
- Data Archiving and Distribution led by Mark Edwin A. Tupas, MSRS
- Training on LiDAR Data Acquisition, Processing,

tion through PHIL-LiDAR I maps

Validation and Flood Modeling led by Dr. Enrico Paringit

Meanwhile, Project B was implemented by 14 SUCs and HEIs distributed nationwide namely: UP Baguio for the Cordillera Administrative Region and selected sites in Region 1 led by Dr. Chelo Pascua; Isabela State University for Region 2 and Abulog River in Region 1 led by Dr. Januel P. Floresca; Central Luzon State University for Region 3 and Pangasinan (Region 1) led by Dr. Annie Melinda Paz-Alberto; UP Los Baños for Region IV-B and Laguna led by Prof. Edwin R. Abucay; Mapua Institute of Technology for Region IV-A (excluding Laguna) led by Dr. Francis Aldrine A. Uy; Ateneo de Naga for Region 5 led by Dr. Emelina G. Regis, UP Cebu for Region 6 led by Dr. Jennifer R. Sinogaya; University of San Carlos for Region 7 led by Dr. Roland Emerito S. Otadoy; Visayas State University for Region 8 led by Engr. Florentino Morales Jr.; Ateneo de Zamboanga University for Region 9 led by Mario S. Rodriguez, MSc; Central Mindanao University for Regions 10, 12 and the Autonomous Region of Muslim Mindanao led by Dr. George R. Puno; Mindanao State University-Iligan Institute of Technology for the northern part of Region 10, and 11 led by Prof. Alan Milano; UP Mindanao for Davao Region and southern part of Region 11, and; CARAGA State University for Region 13 or CARAGA led by Engr. Meriam M. Santillan

More than maps

According to Dr. Paringit, PHIL-LiDAR I Project has already accomplished more than 100 percent of its target, with 76 high-resolution flood hazard maps produced as of March 2016. These are all targeted to be completed in mid-2017, and these 257 plus the 18 major river basins of DREAM will cover mostly around 1,000 cities and municipalities all over the country.

Mentoring of a total of 466 researchers from the 14 HEIs on the data processing, validation and 1D flood modeling was also completed, and the LiDAR facilities of these 14 HEIs nationwide are already fully equipped and operational.

The project has also launched the LiDAR Portal on Data Archiving and Distribution (LIPAD) web portal which serves as the repository and distributor of all the data sets and products that will be collected by the PHIL-LiDAR I. This does not only include the images taken by the LiDAR, but also the flow measurements done in the field. All of these can be accessed and downloaded at lipad.dream.upd.edu.ph.

PHIl-LiDAR I has also developed a preliminary version of Web-based Near-real Time Flood Extent Visualization and Damage Estimations (Flood EVIDEns), an application for flood extent and visualization/ inundation monitoring. This application won the Web Con Award during the Asian Conference on Remote Sensing last October 19-23, 2015 at Crowne Plaza Hotel. On the other hand, partner HEIs are continuously updating the PHIL-LiDAR I-B websites.

Meanwhile, PHIL-LiDAR I team will be training DOST- Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) personnel on the systems and products of the project for the next weeks to be able to sustain the outcomes generated. Since PAGASA is the mandated agency on flood warnings, its personnel will be oriented on how the flood maps were generated and how said maps can be used. PAGASA will manage the project in the future.

Last March, PHIL-LiDAR I team has also started training personnel of the DOST regional offices around the country on making geographic information systems and acquainted them on flood hazard maps. The goal here is for DOST regional personnel to be able to explain to their respective local government units (LGU) about the project and provide them with the needed information especially during disasters.

Moreover, DOST regional offices personnel can also assist in the infrastructure planning work done by the Public Works Department or the LGU by providing inputs on the spatial planning, including the development of comprehensive land use plan particularly on safe zones and no-build zones. DOST regional office personnel will also be able to classify if an area is flood prone or not, and identify the actions to be done.

SUC and HEI partners will also be the regional counterparts of the PHIL-LiDAR I project to be able to fully identify the needs of their locals since they are the ones who know and understand their conditions during hazards.

All of the data generated by PHIL-LiDAR I will be provided to the LGUs, government agencies, and the regions for free.

The PHIL-LIDAR 2 Program complements existing programs of various national government agencies and assists local government units in mapping the Philippines' natural resources.

Planning for your community?
Map it out

By MARY JOY C. BUITRE, JENNY LEIGH DAQUIOAG, & JOY M. LAZCANO
S&T Media Service

After PHIL-LiDAR 1 produced 3D Flood Hazard Maps of the 18 major river systems, this time for the country's nearly 300 minor river basins also for early flood warning, similar to those.

Dubbed the Nationwide Detailed Resources Assessment using LiDAR (NDRA-LiDAR), PHIL-LiDAR 2 has branched into the country's natural resources, such as agriculture, forest, coastal marine, water, and renewable energy, with five new projects under the PHIL-LiDAR 2 Program "aimed at providing detailed assessment of the natural resources of the Philippines," according to PCIEERD.

"LiDAR is a technology that we are committed to advance; it's a state-of-the-art technology. Right now, our capacity-building is paying off, in terms of actual products that are being produced, specifically, for example, the multi-hazards data and assessment that we get from [it]," DOST Sec. Mario G. Montejo said. "We continue to advance this technology by way of coming up with more tools and applications that will directly benefit our country and meet the challenges."

Funded by the DOST, PHIL-LiDAR 2 aims to produce high-resolution national resource maps using LiDAR and other remote sensing data, come up with vulnerability assessment maps for high-value crops and coastal resources, and formulate recommendations to help address future local supply and demand in agriculture, coastal, forest, and renewable resources.

The 3D maps are expected to provide the data and information based on the remote sensing technologies that determine specific rainfall forecasts in certain areas, temperature analysis, prediction of weather, and even soil conditions which affect agricultural efficiency. Aside from this, it can provide data for forest covering to ascertain the number of trees in certain areas. It is also seen as a more efficient tool to determine the concentration of specific minerals for harnessing.

Benefits from 3D maps

Various government agencies benefit from PHIL-LiDAR 2's products or outputs, among them are the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS), which are both DOST-attached agencies; the Department of Environment and Natural Resources (DENR); the Department of Agriculture (DA); the Department of Public Works and Highways (DPWH); the National Irrigation Administration; the Office of Civil Defense-National Disaster Risk Reduction and Management Council (OCD-NDRRMC); and the Department of Interior and Local Government (DILG).

PHIL-LIDAR 2 complements existing programs of various national government agencies and assists local government units in mapping the Philippines' natural resources. State-of-the-art technologies such as LiDAR and other remote-sensing and GIS technologies are used to generate high-resolution resource maps and resource vulnerability maps. These provide detailed assessment of the country's natural resources such as high-value agricultural crops, coastal resources, forest, hydrological and renewable energy resources.

Further, these will help formulate recommendations and address future local supply and demand in agriculture, coastal, forest, and renewable resources through the collaboration of State Universities and Colleges (SUCs) and private higher education institutions (HEIs) in processing and validating LiDAR data and development of resource valuation models. Phil-LiDAR 2 is one of the biggest collaboration of a multi-disciplinary pool of researchers coming from different provinces of the Philippines.

Energy resource mapping

Further, as several developed countries have committed to shift for renewable energy sources by 2025, energy resource mapping would be an important service that the PhiLiDAR program could render in the coming years.

In a recent seminar conducted by the International Renewable Energy Agency and the United Nations Economic and Social Commission for Asia and the Pacific in Davao City, renewable energy resource mapping is a strategic area that will spell out the amount of energy to be harnessed by renewable energy players. Through this, energy players can look at the potential energy in an area for a particular energy source. These resource maps can provide a detailed amount of sunlight against the number of rainfall in an area, therefore developing a projection on the amount of potential energy that can be generated per area.

This expertise can be possible through the PhiLiDAR program that could tailor-fit the data needed for certain industry.

Mapping agri land cover

The Agricultural Resources Extraction from LiDAR Surveys or PARMap Project under PHIL LiDAR 2 successfully produced

The Asia Geospatial Excellence Award for 2015 was received by Dr. Ariel C. Blanco, PHIL LIDAR 2 Program Leader last September 29, 2015 during the Inaugural Session of GeoSmart Asia 2015 Conference in Kuala Lumpur, Malaysia. Dr. Blanco presented a paper on Geospatial Technologies in Natural Resources Assessment, Environment and Climate Change Related Studies highlighting the PHIL LIDAR 2 Program. (With inputs from https://dostphillidar2.wordpress.com/page/2/)

initial sets of Agricultural Land Cover maps distributed to the selected Local Government Units (LGUs). These maps also included electronic copies in the form of shape files and .kmz files that are useful for the planning activities of the municipal agricultural officers. Prior to its turn-over, maps were subject to validation and verification by the LGUs. The Agricultural Mapping Forum held in UP Diliman on July 21, served as their venue for collaboration with the participating LGUs in order to ensure that the use of maps and the sharing agreement is clearly understood.

According to DREAM program leader Enrico Paringit, they are looking at the possibility of packaging the data like for agriculture sector, in a way that will be more beneficial to its recipient. He also added that certain expertise may come out in the future as a result of the diffusion of these data to the farmers.

"As for now, we are looking at the Municipal Agriculture Officer to translate these data to the farmers in a manner that it will be easily understood and significant to them."

Maps for LGUs

A total of 32 agricultural maps were distributed to beneficiaries during the Agricultural Mapping Forum and Turnover Ceremony held last July 21-22, 2015. It was participated in by policy-makers, municipal planners, SUCs / HEIs, and the media.

"It is important that our LGUs know how to interpret the maps so they can effectively use them for planning and decision making," said Usec. Guevara. Dr. Rowena Cristina L. Guevara, DOST Undersecretary for S&T Services, She also stated that the agricultural resource maps will deliver accurate and updated information for LGUs to have better management of resources in relation to the hazards brought by the natural calamities.

Involving the academe

In the phase 2 of the PhiLiDAR program, DOST partnered with State Universities and Colleges (SUCs) in the development of high resolution 3D maps. From the start, the University of the Philippines-Diliman was tapped to do the ground works for the program. As the PhiLiDAR team gained enough traction but with limited manpower, the program proponents thought of involving other institutions to join the party and spread the know-how.

The idea is to capacitate other institutions to develop the portion of the high resolution maps in their region and eventually integrate the data later on. As a value adding initiative, DOST allowed their partners to develop other applications for the map in their localities and widen its uses for the good of the province that they belong to.

Currently, there are 14 SUCs around the country involved in the development. They were trained to perform data acquisition, validation and processing, which means they could get a hand in highly technical data gathering using topographic and bathymetric imaging for land terrain and ocean depth.

These collaborators are free to develop enhancements on the maps with varying uses and target users. However, the collaboration with the SUCs was not fully implemented as other SUCs missed the opportunity due to unforeseen challenges.

Award for PHIL LIDAR 2

The Department of Science and Technology (DOST) once again received the Asia Geospatial Excellence Award for 2015 through for its R&D program, PHIL LIDAR 2: Nationwide Detailed Resources Assessment using LiDAR. The award is given to various institutions to recognize the exemplary innovations and practices in the Geospatial industry in the Asia Pacific at the Annual GeoSmart Asia (Formerly Asia Geospatial Forum).

LIPAD, the hazard information safekeeper

By FRAMELIA V. ANONAS
S&T Media Service, *DOST-STII*

With all the information generated by the LiDAR project, it needs a "depot" to store, manage, and disseminate all those important data. This is why LiPAD, or the LiDAR Portal for Archiving and Distribution (LiPAD) system, was established.

LiPAD is the data distribution arm of the DOST-University of the Philippines Phil-LiDAR 1 Program which produced hazard maps of the Philippines using Light Detection and Ranging (LiDAR).

As such, LiPAD gives local government and interested organizations easier access to hazard maps that can help communities in preparing for disaster. According to LiPAD's site, the site shall facilitate the exchange of information across all components of the Phil LiDAR Program, including all affiliated state universities and colleges(SUCs), and higher education institutions (HEIs) across the country.

The information exchange shall be via web standard protocols at LiPAD's site: www.lipad.dream.upd.edu.ph.

LiPAD's tasks

LiPAD shall safekeep the outputs of the Phil-LiDAR 1 Program, specifically the 3D flood and hazard maps of Philippine river systems. The LiDAR mapping followed the DREAM Program which covered 18 major river basins, and tapped SUCs and private HEIs nationwide in the processing.

LiPAD is maintained by the Data Archiving and Distribution Component of the Phil-LiDAR 1 Program.

The tasks of this component are as follows:

- Distribute LiDAR and LiDAR derived datasets to partner state universities and colleges and higher education institutions, and other stakeholders
- Develop a LiDAR database and distribution system
- Enhance the data archiving skills of state universities and colleges personnel to ensure the proper management and distribution of LiDAR data.

Downloading from LiPAD

Available for download are Digital Elevation Models, Digital Terrain Models, Orthophotos, Classified LAS, and flood hazard maps. These data can now be accessed by stakeholders such as Local Government Units, National Government Agencies, Non-Government Organizations, the academe, and researchers, among others.

To download LiDAR data, users have to register at the LiPAD website. Confirmation email is sent to the user when registration is approved by the Data Archiving Distribution Component of the Phil-LiDAR 1 Program.

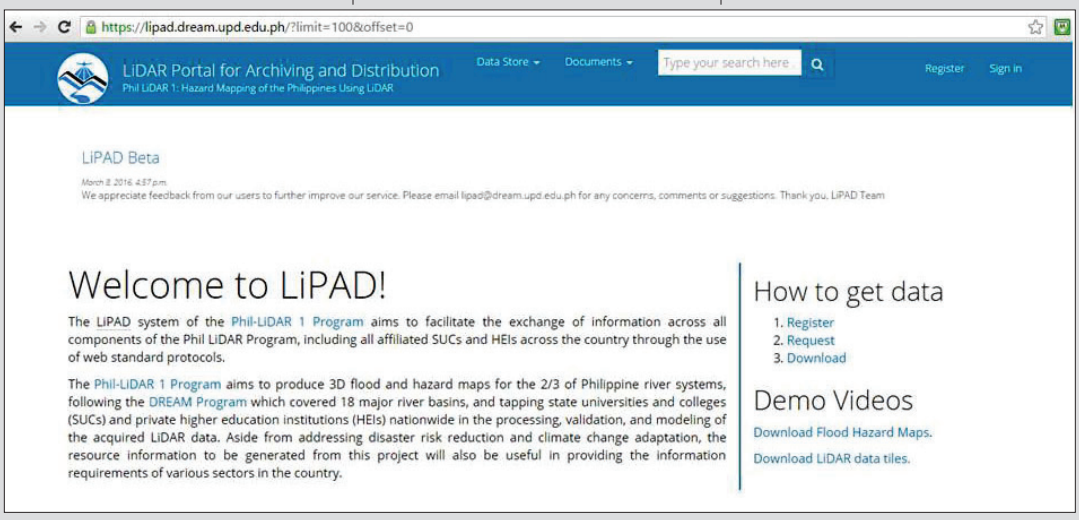
The registration process is one important procedure that enables the project team to check who or which sectors are using the LiDAR data, and what data they are using the most. When analyzed, the data generated can shed more light on how LiDAR is used in the Philippines, and what are the data most useful to various agencies.

Currently, downloads are limited to 10 GB per user, downloaded on a piecemeal basis of 350 mb per day. Data beyond 10 gigabytes will have to be distributed manually.

Strong and fast internet connection is required for successful LiDAR data downloading. Thus DOST advises users to have good Internet connection before downloading LiDAR data. To also facilitate easier downloading in the future, the DAD Component is continuously working on the development of the LiPAD system to make it more usable.

For more information on how to avail of LiPAD's service, here are the contact details:

Address: Rm. 312-216, National Engineering Center University of the Philippines, Diliman, Quezon City, 101 Philippines Tel. No.: (02) 981 8770; Fax No.: (02) 981 8771 E-mail address: lipad@dream.upd.edu.ph



DCAF with a zing

By ESPIE ANGELICA A. DEL LEON
S&T Media Service, *DOST-STII*

Gone are the times when farmers just watch their drought-distressed crops turn brown and become useless. Through the project called DCAF, farmers become more empowered to plan for alternatives when drought strikes their respective communities.

It used to be that the farmer Mang Ambo was caught unaware of drought events, thus leaving him defenseless when dry conditions roll in due to El Niño and global warming. This results in crop shortage, which badly affects Mang Ambo's livelihood, his income, his family's subsistence, and the country's food supply.

Now however, Philippine agriculture paints a more verdant picture, thanks to the Institute of Environmental Science and Meteorology - UP Diliman's research program called Drought and Crop Assessment and Forecasting (DCAF).

Under Project Leader Dr. Gay Jane Perez and with funding from the Department of Science and Technology (DOST), DCAF developed a system that can be used to monitor and forecast drought events in the Philippines to warn farmers and allow them to make the right decision – which crop to plant, when to plant, how to adjust their planting methods and procedures and take other appropriate action to avert the outcomes of such an occurrence.

Drought: Philippine scenario

Drought incidences in the Philippines is associated with El Niño. Globally, increasing episodes of drought have also been linked to global warming.

static.thanhniennews.com

With the Philippines largely dependent on agriculture, it is therefore a highly potential victim of the effects of drought with 32 percent of the country's total land area devoted to agricultural lands.

Drought leads to soil moisture deficit, crop shortage, and crop yield loss, thus greatly affecting the country's food supply, and the livelihood of farmers and other workers in the agricultural sector.

When will drought happen?

Developed in collaboration with the NASA Goddard Space Flight Center in the US, DOST-PAGASA, and the Department of Agriculture-Bureau of Soils and Water Management, DCAF has sets its machine in motion for the prediction of drought occurrences as well as the assessment of crop yield and mitigation of the effects of drought.

Upon its establishment in November 2013, the research program aimed to monitor drought occurrences and crop production and to forecast drought six months ahead of time using both data acquired by the satellite and in situ data. Monitoring will include satellite data from Diwata, such as land surface temperature, precipitation rate, soil moisture, vegetation indices, and reflectance of crops.

Vegetation indices are indicators describing the greenness of a picture element in a satellite image. On the other hand, crop reflectance is the ratio of the amount of radiation reflected by a leaf or canopy to the amount of incident radiation which is radiation that hits a specific surface.

Meanwhile, in situ data refers to on-site data or data taken directly from the object.

However, compared with in situ data, satellite data allows for a faster and more comprehensive analysis of the extent of drought.

To do this, DCAF taps historical and present climate records generated by weather stations and satellite observations as well as weather parameters from PAGASA's automated weather stations and synoptic stations.

For drought forecasting in particular, the program will use statistical and dynamical models to generate accurate forecasts.

With DCAF, PAGASA can use its own resources and equipment along with DCAF's tool to make a forecast on the extent of drought while the Bureau of Soils and Water Management and other such agencies can make informed decisions and policies on the distribution of water supply.

What DCAF will do

Specifically, DCAF aims to come up with the following:

For drought and crop monitoring

- Maps generated from the satellite data:
  - Vegetation Maps at 250-m (from year 2000 to present) and at 1-km (1981 to present) spatial resolution, using the Normalized Difference Vegetation Index (NDVI). NDVI is one of the most common vegetation indices being used. This index refers to plant "greenness" or photosynthetic activity.
  - Soil Moisture Data at 38-km (2002 to 2011) and at 25-km (2013 to present) spatial resolution
  - Precipitation Data at 25-km resolution from 1998 to present
  - Surface Temperature data at 1-km resolution from 2000 to present
- Crop Classification Maps for rice, corn, sugarcane, and other bi-annual crops. The results from validation studies of the relationship of satellite derived vegetation indices to crop phenology will be used in the classification of major crops.
  Phenology is the study of periodic plant and animal life cycle events and how these are affected by climate and habitat factors such as elevation.
- Drought Vulnerability Maps to show areas which are susceptible to drought based on an assessment of historical drought patterns, among others.
- Drought Index. The index/ indices should be suitable to the Philippine climate and geographical location and which can describe and quantify drought characteristics
- Assessment of spatio-temporal extent of historical and current drought events and their impact on crop productivity
- Validation using available in situ data in select sites in Central Luzon and Western Visayas.

For drought forecasting

- Downscaled Climate Forecast Systems regional climate model with satellite and in situ data assimilation
- A combination of statistical and dynamical models that will predict drought at least six months ahead of time.

What DCAF has done

To date, DCAF has investigated the link between satellite data on vegetation indices to crop phenology in the following places: Isabela for corn; Tarlac, Bukidnon and Batangas for sugarcane; and Nueva, Ecija, Mindoro, and Iloilo for rice.
Likewise, it has investigated the link between environmental parameters and crop variability and productivity so that maps can be produced in 10-day, monthly, seasonal, and annual composites for all parameters.

Historical drought events have also been detected using the NDVI. And as of April 2016, DCAF had compiled a list of 23 provinces affected by drought in the Philippines and a list of 31 provinces affected by dry spell, according to PAGASA records.

DCAF has also assessed, through modeling studies, the seasonal changes in evapotranspiration for the various crops of interest and the seasonal and spatial changes of soil moisture content using the Thornthwaite equation (1948).

Likewise, it has developed a statistical technique for drought forecasting concurrent with the dynamical model through regression analyses of historical data using various statistical models.

Currently, DCAF is evaluating indices used by PAGASA, and has produced drought index maps for the period January 2015 to March 2016.

The program has also come up with annual classification maps for rice, corn and sugarcane; as well as drought vulnerability maps for rice and corn, showing areas in the country vulnerable to drought occurrences.

For rice, the highly vulnerable areas are Central Mindanao, Central Luzon, Bicol, Iloilo, and Negros among others while the least vulnerable is Northeastern Mindanao.

For corn, Zamboanga, Cebu, Batangas and half of Eastern Mindanao are the most susceptible to drought while Mindoro, Panay Island, Palawan, Eastern Mindanao were among the least vulnerable.

Aside from these, DCAF has also developed a drought index suitable for Philippine conditions and seasonal forecasts six months in advance with error assessment.

The team has also conducted various trainings for PAGASA personnel.

DCAF is a project that involves various agencies such as DOST's Philippine Council for Industry, Energy and Emerging Technology Research and Development, Philippine Council for Agriculture Aquatic and Natural Resources Research and Development, and Philippine Atmospheric, Geophysical, and Astronomical Services Administration; the University of the Philippines Institute of Environmental Science and Meteorology ; and the Department of Agriculture-Bureau of Soils and Water Management.

Through DCAF, Mang Ambo and other farmers like him will already be guided by proper authorities on which crop to plant, when to plant, how to adjust their planting methods and procedures, and take other appropriate action in the face of drought.

Visayas is now SMARTER

By ALLAN MAURO V. MARFAL
S&T Media Service, *DOST-STII*

Every year, the Philippines needs to survive 19 typhoons-- defeating these acts of nature is impossible, but preparing for these is very possible. Read here how Visayas became SMARTER through the use of space technology.

On November 06, 2013, Typhoon Yolanda with an international Haiyan, entered the Philippine Area of Responsibility (PAR), and caused unimaginable destruction in the Central Philippines. It left 300 dead and destroyed infrastructures amounting to 2.86 billion—but more than that, it left people hopeless. What even worsened the situation was rescue operations could not get through because of damaged roads and because rescue teams didn't still have accurate damage statistics. Because of this, the Department of Science and Technology (DOST) pushed to be SMARTER.

SMARTER Visayas

DOST saw the need to assess damages rapidly—hence, the birth of the promising project SMARTER Visayas. SMARTER stands for "Satellite – based Monitoring and Assessment of Rehabilitation in Typhoon Affected Regions" and theproject SMARTER Visayas was launched as a response to the call to assess the damages that Typhoon Yolanda brought to 171 municipalities or cities.

SMARTER Visayas is under direct supervision of the Advance Science and Technology Institute (DOST – ASTI) in cooperation with the Nationwide Disaster Risk and Exposure Assessment for Mitigation (DREAM).

The wonders of VHR Satellite Imagery

The government agency used a very high resolution satellite imagery using Remote Sensing and GIS as basis for large scale damage assessment. The idea is philosophical, and is based on the immediate release of satellite imagery by image providers, publishing the images in WebGIS format, showing before and after images.

There is no denying that the procedure of comparing the status and damage assessment of a locality based on very high resolution (VHR) imagery shows potential—thus, it is unsurprising that it can bring many advantages. First, it covers wide areas. Second, it can be converted to numerous formats such as maps, charts or statistical figures. Third, it can also be used in the rehabilitation efforts of various agencies—what's great is that actual field data is not needed.

The project has already seen the green light. DOST has already made a formal agreement with Satellite Image Providers for the 171 municipalities within the Yolanda Corridor. All these satellite images would be delivered, and the agency would make use of the images in GIS based damage assessment.

This would then send statistical data to each municipality. Government agencies, Local Government Units (LGUs) and Non – Government Organizations (NGOs) will receive statistics and maps that they can use for their respective rehabilitation programs.

The primary objective of the SMARTER Visayas Project is to use VHR satellite imagery as basis for rapid damage assessment of 171 municipalities or cities affected by Typhoon Yolanda last November 2013 through RS and GIS.

Other objectives of the project can be summarized as: create an archives or catalogue of the delivered Satellite Images for all 171 municipalities; pre-process images before assessing the damages; perform damage assessment through comparison of pre-Yolanda with post-Yolanda Images; produce updated damage statistics within the municipalities as well as in barangay levels; and put the statistics in spread sheet, tables, graphs or GIS Map Format.

The YoRInfo Center serves as the repository of all files, data and information related to Yolanda rehabilitation programs of the government. The Center is tasked to: be the repository system within DOST-ASTI and or DREAM; create archives for all SMARTER Visayas data, information and outputs in the system; stock up all data from other government agencies which include hazard maps, GIS Sharefiles, statistics and other relevant information regarding Yolanda Rehabilitation efforts; and after documenting and submitting the documents, release data to organizations or agencies

Completing the task

On October 12, 2014, the team behind the SMARTER VISAYAS has already completed the assessment of 171 Municipalities and Cities. Based on Satellite Imagery, Remote Sensing and GIS, there was a total of 295,294 damaged infrastructures.

The results and statistics show that Leyte bore the heaviest infrastructure damage numbering to 120,000. Meanwhile, cities with highest damaged buildings are Ormoc City, Tacloban City, Tolosa, Palo and Dulag. Leyte also emerged to be the province with the most number of satellite imagery, numbering up to 795 images.

We would never be completely prepared for any disaster—no matter how the government prepares to come up with zero casualties. Hazards will surely find their way to cause havoc in the country. But there is one thing that
we could surely do—we can find ways on how we can send rapid aid to our affected countrymen—and this by far, is the smartest thing that we could do.

We've heard of tax mapping and hazard mapping. And now, sago mapping? Find out how and why in this article.

Way to go, sago!

By MA. LOTUSLEI P. DIMAGIBA
S&T Media Service, *DOST-STII*

Sago palm or *Metroxylon sagu* Rottb. is one of the few tropical crops that can survive even in wet growing conditions. Further, sago palm is a rich source of starch but, in the Philippines, it is hardly tapped unlike other common industrial starch from legumes, cereals, and rootcrops.

"As far as I know, there is no sago palm industry in the country today," so said Professor Alan B. Loreto of the Visayas State University's Philippine Root Crop Research and Training Center (PhilRootcrops),

Studies show that sago palm contains a large amount of starch in its trunk and its productivity is calculated to be four times that of paddy rice. In fact, sago palm is known as the highest starch producer with a capacity to yield 25 tons per hectare per year.

"In fact, PCAARRD (Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development) intends to include sago as one of the potential crops for research; hence, they (sic) funded a project on sago together with VSU (Visayas State University) and Aklan State University," said Prof. Loreto.

"I believe sago has a potential as a crop. In fact it has always been a source of food for many ethnic groups in Mindanao where sago is grown. Besides, the sago forests do10 not compete in terms of growing areas with other crops because they have different growing conditions. Also, in terms of starch yield per unit area, it is a lot higher compared with rice," Prof. Loreto added.

To find out if there are enough sago palms in the wild for a sustainable sago industry, the Philippine Council for Industry, Energy, and Emerging Technology Research and Development (PCIEERD) under the Department of Science and Technology funded a sago mapping project.

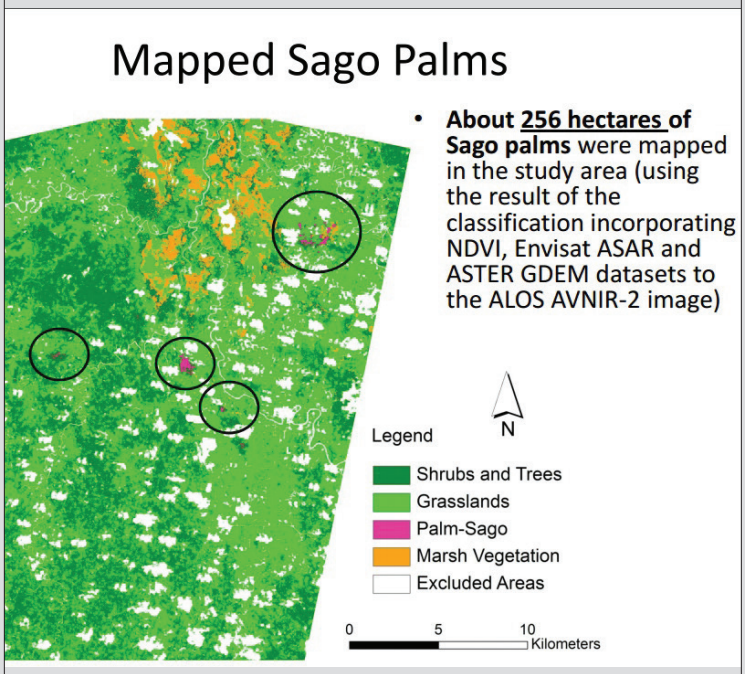
Titled "Sago Bioresource Assessment for Sustainable Industry Utilization Using Remote Sensing, Geospatial and Suitability Analyses," the program is composed of three projects, namely 1) GIS-assisted assessment on sago yields and bioresource availability for sustainable industry utilization; 2) Biophysical, structural and spectral characterization of sago and its environmental conditions; and 3) Mapping sago habitats and sago suitable sites using optical and radar image analysis and suitability relationships.

Prior to this, a component project of the UP Mindanao Sago Research Program Phase 1 entitled "Assessing the Sago Bioresource in Mindanao Using Remote Sensing Technology" looked into the location and extent of sago palm distribution in Mindanao to know if there are enough sago palms in their natural habitat to support a large-scale sago starch industry.

The project was able to identify 86,000 hectares of sago palms in Agusan Province. This is part of the 850,000 hectares of suitable area for sago for the whole island of Mindanao, and another 700,000 hectares of probable land area with sago.

However, the initial study concerning the aspects of the projects methodology had an issue over the "raw" satellite images used in the project and their pre-processing, including the accuracy of results. This concern led to Program II of the sago mapping project which aims to further evaluate and make refinement on the location, extent, and distribution of sago areas in Mindanao previously identified in Phase 1. The new phase looked further into the presence and extent of distribution of natural sago stands in Visayas.

The first project was led by Dr. Nilo B. Oponda, then taken over by Engr. Joseph E. Acosta of University of the Philippines Mindanao. In this project, transect mapping was done to assess the density of sago palms in sago identified areas in Mindanao to enable the estimation of the total number of harvestable sago palms.



Source: From the report of Engr. Jujene R. Santillan for the project "Mapping the Starch-rich Sago Palms through Maximum Likelihood Classification of Multi-source Data."

CONTINUED ON PAGE 30

JAXA scientists mentor Pisay teachers on space education

By MARCO D. MELGAR
ST Media Service, *DOST-SEI*

Philippine space science is certainly on its way up.

Earlier this year, Diwata-1 made headlines as the first Filipino-made microsatellite. It was eventually launched in April with the help of the Japan Aerospace Exploration Agency (JAXA).

This brings the country closer to its vision of having its own space agency. In fact, we have stepped even closer to that dream as some scientists from JAXA visited the country for a unique space education seminar.

Last February, four JAXA experts namely Nozomu Sakuraba, director of JAXA's Space Education Center; Dr. Yukio Shimizu; Mika Hosobata; and Chris Okano led the seminar entitled "Exploring Space Science in the Classroom" before 25 science teachers from the Philippine Science High School System. It was held at the Hotel Stotsenberg in Clark Freeport Zone, Angeles City, Pampanga.

The resource persons discussed how to integrate space learning into the classroom, with some interesting topics on microgravity, vacuum experiment, Canadian Robot Arm on the International Space Station, rovers and communication, satellite imagery, and others.

"The goal of the visit is to learn first-hand from these JAXA experts whose work focuses on integrating space science education in the classroom," said SEI Director Dr. Josette Biyo.

Dr. Rogel Mari Sese, Filipino astrophysicist and focal person to the Philippine Space Science Education Program (PSSEP), said the visit details was forged during the 22nd Asia Pacific Regional Space Agency Forum held in Bali, Indonesia on December 1-4, 2015, through the recommendation of the Space Education Working Group.

Sese also reported on the implementation of space education in the Philippines during the seminar.

"This activity helped us enhance school teachers' understanding and appreciation of space science, enabling them (teachers) to adopt various approaches in teaching space science and develop teaching tools from indigenous materials that can expand science subjects in schools by including astronomy and space science in their lessons," Biyo added. "With Dr. Sese on the lead, we will also establish closer ties with JAXA for better and more effective implementation of our projects under the PSSEP."

Also part of the activity was the use of the Science Explorer, a mobile science learning facility which conducts sessions on earth science, chemistry, robotics, physics, mathematics, and biodiversity with elementary and high school students from nearby schools.

"We want this visit to be more engaging that's why we're bringing in the Science Explorer to make sure our impact reaches not just the teachers but the students in the area as well," Biyo disclosed.

Women's Month Special Feature

This lady's ticket to NASA: Pers

By GRALDINE B. DUCUSIN
S&T MEDIA SERVICE, DOST-STII

She's unlike those girls who knew firsthand at a young age that they want to be a doctor, or a scientist. Not like Hillary Clinton who wanted to venture in NASA or outer space at age 10. She was a regular girl in a girl's school in Bicol who simply wanted to have many friends; an only child who wanted very much to belong.

Meet Dr. Gay Jane Perez, an associate professor at the University of the Philippines Institute of Environmental Science and Meteorology (UP-IESM) and a postdoctoral fellow of the National Aeronautics and Space Administration - Goddard Space Flight Center (NASA GSFC). She lives up to her name, a happy, soft-spoken person who's no stranger to hardships in life which eventually became instrumental in achieving a-once-in- a-lifetime opportunity --- gaining an experience at NASA.

Memorable early schooling

Dr. Gay, as she was fondly called at the Institute, was born in Bicol and obtained an early formal schooling in a girl's school there. While coming from humble means, her folks worked hard to give her a good education. They instilled in her at a young age the importance of always going for excellence in anything she does.

Her folks sustain their small family through a sari-sari store and bakery.

She recalled memorable childhood experiences.

"I was in Grade 3, when I noticed that when you're very good, your classmates dislike you. They can isolate you. Of course, when you want to be the first, you won't allow your classmates to copy from you, she said.

Because of that experience, she asked her mother if it's okay not to be the top (number one) in her class, but she would still be among the top ten. Her mother approved, so she laid low and tried to relax since then.

While her school is not a science school, they still participated in Math and Science quiz bee contests. She was often tapped to join the Math and Physics competitions, the two subjects she excelled in during her high school years.

Despite this, however, she still felt inadequate because she believed that those coming from the science high schools had a head start in these subject areas.

UP has levelled the playing field

When she passed the Department of Science and Technology's (DOST) scholarship in 1998 for an undergraduate degree at the

University of the Philippines, she and her parents immediately hopped into a bus the next day after her graduation and headed for Manila. They closed their small business and relocated to Quezon City because her parents wanted to guide her along. They had to start their life all over again because they found that the money they had with them was no longer enough due to the high cost of living in the city.

Had she not been a scientist, she would probably be in the area of finance because she's exposed to her parents' business. She was planning on taking up Accountancy. But the scholarship required her to take up any field in math, science or engineering.

As she's been in Physics quiz bee in high school, she figured she could probably handle Physics, so she signed up for that.

She was originally planning on shifting to another course eventually, but she was somehow stuck as she badly needed a scholarship at the time, otherwise she couldn't afford to finish college. So, she carried on with her course in physics.

"Anyway, I'm used to owning up to anything that happens in life, so I stuck it out with my course, " she said.

It was during her third year college when she became interested in the laboratory work. She was mentored by Professor Caesar A. Saloma. If in the past she was wary of her capabilities coming from a non-science school, those doubts were erased in research. She learned that research can level the playing field, and that the importance of the school where you came from can be tempered by hard work and persistence.

One's capability is no longer confined to what one can memorize or read in books. In the research field, the battle is to what extent you can be patient in finding the answers and how hard you're willing to work for those answers you seek.

According to Dr. Gay exposure to hardship is a plus for people who want to pursue research because in research, you don't easily obtain results. If you're used to getting the things you want

everance

Photo by Henry A. de Leon

fast, you get easily discouraged for things that don't have easy answers. But since she's used to not having the things she wanted, research suits her.

What excites her about being in the research field is the eureka! moment when she finds answers to difficult questions.

Did she ever have a social life in college? Surprisingly, she did. Her friends in high school would pick her up at the laboratory and bring her around Makati or Antipolo to unwind. There was an incident when a guy asked her name and what she does. She told him her name and said she teaches. The guy asked, what does she teach? She answered, "Physics." Then, the guy delivered his exit line, "Oh, nice to meet you." At past midnight, her friends would deliver her in the steps of the lab, and she would usually just go back to working on her research.

On crossroads and big breaks

In UP, Dr. Gay was surrounded with very good physicists and many of them were female scientists. She saw that they're enjoying what they're doing.

She was so excited and proud of her college thesis that a higher degree seemed to be the next natural thing to do. She signed up again for another scholarship, MS in Physics, and after a few years, a PhD also in Physics.

When her friends started to have their own lives, gained new friends at work, she remained at the university, studying the same topic, surrounded by the same people, taking a vow of poverty common to the life of an academic. She's in her PhD then, when she began to have doubts on what she's doing. She wondered if the struggle was worth it and what it is for.

She completed her PhD, ready to look at other opportunities that would put an end to her vow of poverty when she was informed by Professor Saloma that DOST has a program, the Accelerated Sciece and Technology Human Resource Development Program (ASTHRDP) which can fund post doctoral endeavors even abroad. She can choose any institution she liked, her mentor said. She looked up the programs in prestigious universities like Harvard or Oxford. But what came by her was unexpected, one that she didn't imagine.

Professor Saloma told her that in one conference he attended he encountered a Filipino scientist at NASA who's willing to host a fellow. She couldn't believe it. The opportunity was immense that she didn't think of its equivalent in terms of service obligations anymore.

It may seem that doors merely automatically opened for her, but the truth is that in between all those accomplishments, every degree she has earned, entailed a lot of hard work.

The NASA experience and latest involvements

In her studies at UP, she dealt with complex systems dynamics wherein she studies possible panic behavior. She did computer models tested on mice. But at NASA she learned that while it's good to know how to model weather and climate, her professors emphasized that it's important to understand the observation and measurement of actual and historical data.

Currently, she's involved in several projects, mostly on remote sensing: fish mapping, drought, mangroves, deforestation, and others. The Diwata project integrates all these projects. The government's goal is for us to be able to use our own generated data in identifying, for instance, where a calamity might strike so we can better prepare, where we can gather the most fish, where is the best place to plant crops, and other applications. We can study the weather and climate, use the data not just on vegetation, but also on the temperature and rainfall at the same time. Diwata would allow us to study the environmental condition from a barangay to national scale.
Her struggle right now is doing many things at the same time and she's still trying to manage her time.

Meanwhile, her form of relaxation is meeting different people in the course of her work. Her day off is attending conferences, which is still about work. But she's enjoying them.

Her colleagues joked that she should've focused on getting married first, because PhD stands for "Pang Habangbuhay

*This lady's...**from page 29***

na Dalaga." Her folks are happy for what she's accomplished academically, and her mother's only wish is for her to tie the knot eventually. But as for her, she's not rushing. Like all those opportunities, she believes that, that too, will come if it will come.

On success, gender issues and parting shot

Dr. Gay believes that she has not yet reached the peak of her career because in the academic setting, one can only consider oneself a success if one is able to mentor another PhD. She has yet to influence and mentor at least one.

Like her earlier experience of being bullied through isolation, which she didn't give much thought, she also didn't consider gender an issue until she was sent to a gender summit - women in physics. The event opened her eyes that there is a gender issue in some scientists' awards for instance in which the cut-off age is 40. She learned that the reproductive and child rearing period somehow puts women at a disadvantage because they had to trade those years during which they can be academically productive with the years spent have to bear and take care of children.

The advocates were pushing for the extension of the age limit to 45.

She also learned that there is a gender issue in technology, such that some of these favor men. But she didn't personally experience being discriminated against as far as her gender is concerned, especially since in Physics, there are many women in the field in UP.

Asked how she can describe herself and what trait has guided her through all these years, she has this to say:

"I don't fold. I wouldn't take no for an answer. I believe there's always a way for everything. It may seem that all things have been easily laid out for me, but it's not. I've worked for the process on a daily basis. There are struggles. I was lucky that in the process, there's something there (like another scholarship). I embrace opportunities, work for it, and like a snowball, there's another opportunity (like projects and another projects). I just carry on."

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*Way to...**from page 26***

The research team harvested and processed 60 sago palms to compare the differences of flour yield of every growth stages from the three environmental soil conditions, namely dry, wet. and submerged or water-logged areas. The team also wanted to determine the age and environmental condition where flour yield is highest.

The result of the analysis on the trend of the starch yield of wild grown sago showed that inflorescence stage is the best time to harvest sago palm. This is the stage when a group or cluster of flowers are arranged on a stem composed of a main branch or a complicated arrangement of branches.

Among all provinces, Agusan del Sur and Agusan del Norte have the largest sago palm covered areas, comprising 94 percent of 656.11 hectare total of sago palms that may produce up to 1,800 tons of sago flour which covers only 1 percent of the total demand.

The second project was led by Engr. Meriam M. Santillan of Caraga State University. It covered 14 provinces in Visayas and Mindanao where sago palms were reported to exist. The major findings showed that sago palm generally thrives in grassland and dry bare soil substrates and co-exists within or near rice fields, residential areas, coconut plantation, and creeks.

The habitat suitability analysis found that 1,003,161 hectares of lands in Visayas and Mindanao were found to be biophysically and bioclimatically "suitable" for growing sago palms. The suitable areas were found in the provinces of Aklan, Capiz, Negros Oriental, Cebu, Bohol, Leyte, Northern Samar, Samar, Misamis Oriental, Agusan del Norte, Agusan del Sur, Surigao del Norte, Surigao del Sur, the Davao provinces, North Cotabato, Shariff Kabungsuan, and Maguindanao.

The last component of the project was conducted through an integrated approach using optical and radar remotely-sensed images and use of statistical and GIS-based suitability analysis which was done by Engr. Jojene R. Santillan of University of the Philippines Diliman.

Through examination using data from field surveys, and recent high-resolution Worldview-2 images, the suitability map generated has a prediction accuracy of 93.52 percent. Based on the suitability map, a total of 999,491 hectares of lands in Visayas and Mindanao were found to be biophysically and bioclimatically "suitable" for growing sago palms.

There were 415,260 hectares marked with "excellent" suitability and 104,020 hectares marked "very suitable". In their study, most of the "very suitable" to "excellent" suitabilities were identified in Visayas and Mindanao. In Visayas, majority of these municipalities are in Leyte and Aklan. In Mindanao, majority are found in Agusan del Sur, Agusan del Norte, Surigao del Sur, and Surigao del Norte.

"The sago growing areas in the country are fairly scattered and if ever the country would like to develop a sago industry then it should start planting sago in a compact farm that should serve as buffer to the processing plant similar to Malaysia and Indonesia," Prof. Loreto advised.

Prof. Loreto shared that the PhilRootcrops is also working on a sago project as a stepping stone to develop the sago industry in the country. The project will be led by Dr. Marcelo Quevedo, also a researcher of the PhilRootcrops.

"What we basically need is to develop the market and tap the global market for sago starch," he remarked.

Street, carinderia food in Cebu now safer after vendors get DOST training

By TRISTAN L. ABANDO
S&T Media Service, *DOST-Region 7*

WHEN IN Cebu City, doubt no longer as you chew that barbeque you just bought from a street food hawker. If the cook, who may also be the vendor, went through the food safety awareness seminar co-organized by the Department of Science and Technology (DOST), chances are, it's safe.

This is after 80 Cebu City-based food vendors participated in the food safety awareness seminar organized by DOST VII, Cebu Chamber of Commerce and Industry and Germany's AFOS Foundation for Entrepreneurial Development Cooperation through its collaborative program "Optimizing and Upscaling Roles in the Food Supply and Value Chain" (OURFood). The seminar was held recently in Cebu City in cooperation with the Cebu City government and the Cebu Provincial government.

Resource person Josie F. Elli, Senior SRS and food safety expert of DOST VII, taught participants the importance of sanitation, hygiene, and food safety on food service operations.

These food vendors are operating in Larsian Barbeque Bazaar and Cebu South Bus Terminal. Larsian is a circle of small eateries where the different vendors hawk their barbecues. The Cebu South Bus Terminal vendors also operate small eateries or local pasalubong stalls. Larsian and Cebu South Bus Terminal have been part of the tourism industry in Cebu.

The safety of the barbecues and the local food delicacies sold by these street vendors is one of the Cebu City government's concerns.

Cebu City Councilor Mary Ann de los Santos, chair of the Committee on Health, emphasized that food safety equates to public health.

Meanwhile, some 69 food handlers based in Santa Fe, Bantayan Island, Cebu were likewise trained by DOST VII on basic food safety and hygiene last March. The trainees were composed of 46 food vendors and small eatery operators and 23 bar, restaurant, and resort operators.

Food vendors and food establishments operators in Santa Fe, Bantayan Island, Cebu

According to Santa Fe Mayor Jose B. Esgana, the practice of food safety by food vendors and operators of food establishments could boost the tourism in Santa Fe since this could result in increased tourists' confidence on the food they eat during their visit to the island.

This food safety awareness seminar forms part of the DOST VII Regional GIA assisted project "Community Empowerment through Science & Technology (CEST) for LGU Santa Fe". This is also the counterpart project of DOST VII for the Yolanda Recovery & Rehabilitation Program and Accelerated and Sustainable Anti-Poverty Program (ASAPP).

Over the past decade, the issue of food safety and hygiene has become a primary concern of consumers and is their first yardstick in patronizing food establishments.

DOST VII through the Small Enterprises Technology Upgrading Program (SETUP) has been consistently assisting the food industry as one of its priority sectors. DOST VII created the country's pioneering multidisciplinary team of trained food safety specialists – the DOST VII Food Safety Team-- to assist the food SMEs.

The DOST food safety program is strengthened with the collaboration with the Cebu Chamber of Commerce and Industry and AFOS Foundation through the OURFood Program. The program is designed to be market-driven to increase value creation in the primary and manufacturing food sectors through training and qualification throughout the entire supply chain.

Currently, the food safety team has been expanded to Cebu Food Consultancy Group which is now capable of supporting food SMEs not only in food safety but also in food technology. The new group includes food safety and food technology experts from the DOST, the academe, other government agencies, and private sector.

The partnership with Cebu City government and Cebu Provincial government is a significant milestone in the implementation of the OURFood program. The partnership aims to get local legislative support and attain maximum reach of the program.

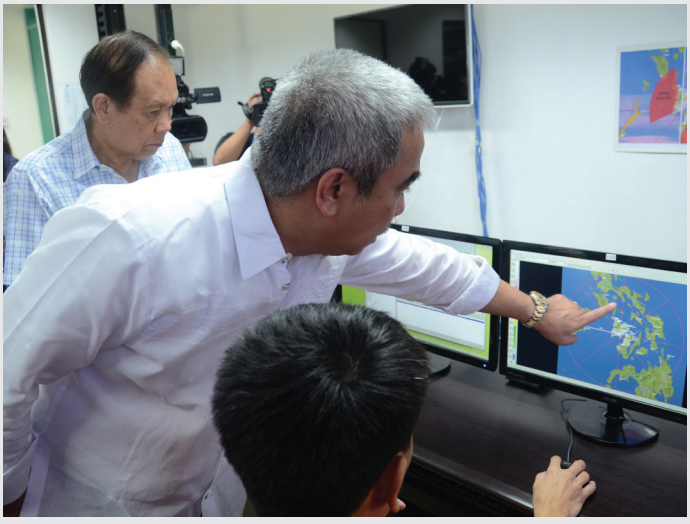
The CEST program, meanwhile, hopes to strengthen the existing livelihood of the people in Santa Fe and provide alternative livelihood opportunities. Aside from fishing, operating small eateries, selling food products in stalls and working in bars, restaurants and resorts are other prevalent livelihood of the locales due to the booming tourism industry in the island. Critical to sustainability of operating food establishments is the practice of food safety in order to meet the increasing demand for safe food products to be served for local and international tourists.

Signed, sealed, delivered

DOST S&T package lands in Iloilo via Science Na

By RODOLFO P. DE GUZMAN
S&T Media Service, *DOST-STII*

DOST Secretary Mario G. Montejo (2nd from left) turns over the Reference for Emergency and Disaster or RED Book to Director Ro-Ann Bacal (3rd from left) of NEDA Region VI and acting director of the Regional Development Council VI as DOST Region VI Director Rowen R. Gelonga looks on.



DOST Secretary Mario G. Montejo points to the computer screen showing a weather map during the inauguration of the Iloilo Doppler Radar and Synoptic Station of PAGASA. Looking on at the background is Governor Arthur Defensor Sr. of the province of Iloilo.

DOST's SNT campaign in Western Visayas has opened up more opportunities for Ilonggos in increasing business productivity of homegrown enterprises particularly engaged in food manufacturing, personal care products, metal craft and handicrafts.

On its 5th leg, the SNT landed in the City of Love, Iloilo City. Dubbed Science Nation Tour Western Visayas: Ang Sci-Ya, Sci-Ya sa West V!, it served as a vehicle to deliver science and technology products and innovations to Mang Juan and Aling Maria to improve their quality of life.

This is consistent with DOST's mandate to create and develop technologies and innovations that will improve crop yield; produce more accurate weather forecasts; provide clean potable water; provide low cost herbal medicines and empower our micro, small and medium entrepreneurs so that they can be competitive in the international world of trade.

S&T package: Signed, sealed, delivered to Iloilo

The Tek-Tienda MSME Product Fair at the SM City Iloilo Activity Center, the Tour's first stop, was opened by Sec. Mario Montejo who

o-ilo

tion Tour

Front (from left) PSHS-WVC Director Shena Faith M. Ganela, DOST Secretary Mario G. Montejo, Taytay sa Kauswagan, Inc. (TSKI) Micro-Finance Success Institution and Business Development Services Division Head, Engr. Reynaldo T. Ambao, and DOST Region VI Director Rowen R. Gelonga.

Back (from left) DOST-Information Communications Technology Office Visayas Cluster I Director Frederick DC. Amores and Philippine Association of State Universities and Colleges (PASUC VI) President, Dr. Victor Navarra.

DOST Secretary Mario G. Montejo (2nd from left) answers queries from local media during the press conference for the Special Forum on Science and Technology held on February 23, 2016 at the NEDA VI Building in Iloilo City. Others in photo are (from right) Frederick Amores of DOST-ICTO, Director Renato U. Solidum of PHIVOLCS, Director Rowen R. Gelonga of DOST Region VI, and Director Ro-Ann Bacal of NEDA VI.

DOST Region VI Director Rowen R. Gelonga (left) shows DOST Secretary Mario G. Montejo several organic products made from coconut of the Fruit of Life Enterprise & IKMAR, one of the exhibitors in the DOST Tek-Tienda Product Fair and Exhibits.

DOST Secretary Mario G. Montejo looks at one of the science exhibits of a student from the Philippine Science High School-Western Visayas in Jaro, Iloilo City.

hopped from stall to stall, talking to the business owners and their staff on their respective products.

On parade were various food products unique to Iloilo like the piaya by Merzci Pasalubong, butterscotch pastries of Rgie's, dried mango chips from the Trappist Monks, and the biscocho and otap baked goodies. Tasty and affordable, the goods attracted a huge crowd.

Also on display were novelty items like bags and wallets made of indigenous materials; home decorations and accessories; environment friendly soaps and lotions; metal craft products; and herbal supplements, among others.

At the same time, there was the display of robotics technology and other scientific experiments and projects of gifted students from the DOST's Philippine Science High School. The interesting creations of the scholars range from wine concoctions to mechanical robots that can do simple tasks that, if replicated on a larger scale, have the potential of becoming viable business enterprises.

Sci-Night S&T Stakeholders' Night honors DOST stakeholders

To cap the first day, the DOST Regional Office VI headed by Director Engr. Rowen Gelonga hosted the Sci-Night S&T Stakeholders' Night held at the posh Diversion 21 Hotel, giving honor and recognition to DOST partners in government and the private sector.

The Dungog S&T Awards in different categories were given to DOST partners who have shown great potential and success in their respective fields and as a way to encourage other government partners and business entrepreneurs to aim for the highest bar of excellence as their way of contributing to the economic growth of the province and the entire region. Dungog is a local word for pride or honor.

The Dungog S&T Award for Local Government Unit was given to the provinces of Negros Occidental, Iloilo, and Aklan. The Dungog Award for Private Sector and National Government Agencies was conferred to SMART Communication, Pfizer Philippines, Department of Health Region VI and Department of Agriculture Field Unit VI.

On the other hand, the Dungod Award for Non-Government Organizations went to the following: Negrense Volunteers for Change Foundations Inc., Negros Prawn Producers Cooperative, Association of Negros Producers, Taytay sa Kauswagan Inc., and the Philippine Association of State Universities and Colleges.

For the student achievers, the DOST handed over the Dungog S&T Award to PSHS-

Engineer Joe Val P. Alipin receives his DOST Dungog S&T Award-DOST Scholars Category for exemplary academic achievement, having graduated summa cum laude and ranked 3rd during the Chemical Engineering Board Examinations.

Philip S. Cruz, president of Herbanext Laboratories Inc. and 2005 TOYM awardee receives another recognition, the DOST Dungog S&T Award-SETUP Beneficiary Category, for promoting the use of natural and herbal ingredients for health and personal products like the "Roselle Fiber Strip."

Atty. Suzette Mamon represents the Province of Iloilo that was awarded the DOST-Dungog S&T Award-LGU Category for promoting science and technology as a vehicle for economic development in the region.

WVC Scholars to the following: Joachium Regalado, Felicia Alodia Marie Rentoy, Dyan Reizl Valencia, Mickel Lyle Angelo Pe, Dominic S. Yap, and Czarina Apdon. The first three were involved in the production of an eco-movie that was included in an international film exposition while the last three students mentioned were delegates to a mathematics competition in Singapore.

Graduates of DOST scholarship programs were also honored with the Dungog S&T Award for DOST Scholars category that included the following: Engr. Remington B. Salaya Jr., a cum laude graduate and 1st placer in the Board Examinations for Chemical Engineering; Engr. Abraham A. Porcal, cum laude graduate and 10th placer in the Electronics Engineering Board Examination; Roxzien Shaye Sesbreno, a magna cum laude graduate and 10th placer in the Chemist Licensure Examinations; and Engr. Joe Val P. Alipin, a summa cum laude graduate and 3rd placer in the Chemical Engineering Board Examinations.

Lastly, the Dungog S&T Award for DOST-SETUP Beneficiaries was given to the following: Filbake Food Corporation for innovative food products that have reached different markets; Herbanext Laboratories Inc. for their herbal supplements using indigenous medicinal plants; and Trappist Monastic Food Products for their unique baked goodies and processed food well known locally and abroad.

Iloilo Doppler Radar and Synoptic Station unveiled

Part of the SNT campaign in Region VI was the formal inauguration of the 13th Doppler Radar and Synoptic Station in the country held on February 23, 2016 at its site in WESVIARC, Barangay Hamungaya, Jaro, Iloilo City.

The station that was put into operation last May 2015 will provide PAGASA more weather data for more accurate and comprehensive weather forecasting as its range now includes Masbate and Sorsogon provinces in the north and Surigao and Davao provinces in the south.

"This will complement the Cebu Doppler Radar Station, virtually covering the entire Visayas Region and provide nowcasting for localized weather forecasts for Iloilo, Bacolod, Negros Occidental, Antique, Roxas, Aklan, and even Boracay," said Secretary Montejo.

Also present during the ceremony were: Governor Arthur Defensor Sr. of the Province of Iloilo; Dominador Co, Executive Assistant and representative of Iloilo City Mayor Jed Patrick Mabilog; Peter Sobrevega of the Department of Agriculture VI; Pablo Guevara representing the Mayor of Oton; Jerry Biona of PDRRM Aklan; Dr. Landrico Dalida Jr., PAGASA Deputy Administrator; Dr. Flaviana Hilario of PAGASA; DOST VI Regional Director Rowen Gelonga; and Engr. Oscar Tabada, OIC of Visayas-PAGASA Regional Service Division.

RDC Meeting features Special Forum on S&T

Secretary Montejo, at the Regional Development Council Meeting, presented the different DOST programs and knowledge products that can help the entire region in the areas of disaster preparedness and mitigation, weather forecasting , earthquake and landslide monitoring, enterprise development, information and communication technology, educational scholarship grants, and healthcare.

"Our S&T and innovation programs are all aimed at empowering our local government units and communities so that they can reduce the risk of natural hazards like flood, landslide and earthquake and at the same time provide our people with S&T tools to improve their small businesses like the Food Innovation Center, increase agricultural production through using high-yielding crop varieties and seeds, and provide more scholarships to our talented students," Secretary Montejo said.

In the issue of healthcare, Dr. Dennis Batangan of the Ateneo de Manila University discussed the eHATID Health Information System while Dr. Aretha Ann G. Liwag of the West Visayas University Medical Center presented the RxBox Telehealth project under the DOST's Philippine Council for Health Research and Development.

On disaster preparedness, Dr. Renato U. Solidum Jr., PHIVOLCS Director presented

One of the attractions during the Science Nation Tour in Iloilo City was the Planetarium at the Philippine Science High School-Western Visayas.

Senslope and Dynaslope projects for detecting landslide. On the other hand, PAGASA Visayas OIC Engr. Oscar C. Tabada presented the capabilities of the Iloilo Doppler Radar and Synoptic Station. Light Detection and Ranging technology or Phil-LiDAR 1 and 2 was later discussed by Dr. Jonnifer R. Sinogaya and Dr. Judith Silapan, both from University of the Philippines Cebu.

For his part, DOST VI Regional Director Rowen Gelonga talked about DOST's other projects geared at helping MSMEs improve productivity and quality standards of their products and educational tools. These include the programs called One Expert (sharing of knowledge by S&T experts), One Lab (network of laboratory testing and analysis services), One Store (digital portal for centralized market hub for SETUP products), and STARBOOKS (a digital library-in-a-box that contains hundreds of thousands of S&T information in print and video formats).

All in a day's work

Other activities of the Science Nation Tour to Iloilo included a visit to the Philippine Science High School-Western Visayas Planetarium, a press conference after the RDC meeting at the NEDA VI building in Fort San Pedro, the Health Research Utilization Forum held at Eon Centennial Hotel, Symposium for the Youth with National Scientists and Academicians, and the Sci-Fit Science and Fitness Mix.

At the end of the day, it can be said that the different events in the SNT-Western Visayas are all in a day's work for all S&T workers and stakeholders. This ushers in the beginning, rather than the end, of a more aggressive stance of promoting the different DOST programs and knowledge products in all the regions in the country.

"We have all the science-based products, inventions and innovations that we are bringing closer to the people who need them most because at the end of the day, what is important is that we are able to improve the quality of life of our farmers, of our fishermen, of our small entrepreneurs, of our students and our families. Then and only then can we say that we at DOST have done our job, of making science and technology work for our countrymen," concluded Secretary Montejo.

Robotics is cool. Students from Pisay-Western Visayas Campus in Iloilo City mix science, technology and fun by building small robots similar to Wall-E or your favorite Transformers in an exhibit held at the SM City Iloilo. The PSHS is part of the DOST system that provides high quality education to equally talented students referred to as "scholars ng bayan."(Photo and Text by Rodolfo P. de Guzman/S&T Media Service)

Pisay students high in spirits. Yes, students of the Department of Science and Technology's Philippine Science High School in Iloilo are indeed in high spirits as they show their wine making project, using science and technology to concoct unique wine products out of different materials. The event showcased different science projects of Pisay students and the Tek-Tienda Product Fair where creative and innovative entrepreneurs displayed and sold their unique food products ranging from sweet delicacies of the region to herbal juice and supplements to woven products of intricate designs. (Photo and Text by Rodolfo P. de Guzman)

Students, faculty and DOST Region VI staff pose with DOST Secretary Mario G. Montejo (center) during the latter's visit to the Philippine Science High School-Lawaan H. Lopez Campus in Jaro, Iloilo as part of the activity.

There's more than tuna in Soccsksargen

By JOY M. LAZCANO
S&T Media Service, *DOST-STII*

DOST Secretary Mario G. Montejo (in white) was given a Maranao sword called 'Kampilan' by DOST Region XII director Zenaida P. Hadji Raof Laidan as a symbol of his strong leadership and advocacy in promoting S&T even to the far-flung areas of the country.

Secretary Montejo joins Assistant Secretary Urdujah A. Tejada (left) and Dir. Laidan in the launch of the DOST XII Science Nation Tour exhibits.

There is no way of stopping a small contingent of science workers in reaching out even to the heart of Mindanao to share what science has to give to Mindanaoans as the Department of Science and Technology (DOST) goes to SoCCSKSarGen for the Science Nation Tour.

Science Nation Tour is a national roadshow aimed at making science felt by the average Filipino people down to the grassroots - to the last mile primarily thru massive promotion and expansion of programs, projects and services of the DOST throughout the country.

Staged in the KCC Mall Convention Center of General Santos City, the country's tuna capital, this science-filled gathering highlighted the many achievements of DOST in the region, as well as various opportunities available to people. DOST XII Regional Office Director Zenaida P. Hadji Raof Laidan welcomed all participants with a bang.

DOST Regional Director Laidan welcomed participants led by DOST Secretary Mario G. Montejo in the traditional Muslim-inspired hospitality,

topping the morning ceremony with traditional Muslim dance and music.

Assisting the SMEs

During the opening of the Science Nation, Dr. Laidan highlighted DOST's achievements in the region for the last six years.

One of the notable programs of DOST in the South Central Mindanao is its assistance to the Micro, Small and Medium Enterprises (MSMEs) through the Small Enterprise Technology Upgrading Program or SETUP. The program provides technical and technological assistance to MSMEs to enable them to improve their production capabilities by infusing science and technology. Specifically, the assistance is in the form of equipment upgrades, food safety standards consultancies, production improvements, and product labeling to name a few.

"SETUP offers complete package of assistance to enhance the capability of our SMEs in the country," explained Dir. Laidan.

She added that for the last few years, DOST XII has assisted 1,500 firms under SETUP that generated thousands of jobs. Most of these enterprises are on food manufacturing.

Mr. Fred Fredeluces of Greentropics Coffee Enterprise is one of the success stories of DOST XII's SETUP. Please read his story on page 48.

To provide marketing support to products like the Greentropics coffee, DOST formally launched its OneStore, the online store for DOST assisted products across the country.

DOST OneStore is a user friendly online store that houses hundreds of various products under SETUP such as food, food

DOST-STII Chief and Executive Editor of S&T Post Dr. Aristotle P. Carandang receives from Dr. Zenaida P. Hadji Raof Laidan an intricately carved Maranao chest during the fellowship night.

Mr. Fred Fredeluces presents his Greentropics Civet Coffee products, which provides livelihood to the B'laan tribe coffee growers. Right photo shows DOST Region XII Director Zenaidaa P. Hadji Raof Laidan discussed the intricacies of the growing local Halal food industry.

SCIENCE GOES TO SOCCSKSARGEN. Department of Science and Technology Secretary Mario G. Montejo greets student-participants to the Science Nation Tour held from February 16-18. The event featured launches of various projects, visits, fora, technology demonstration, inventors' contest, exhibits, and others. The national roadshow aimed to make communities "feel" science through various activities relevant to different sectors of the society. With Sec. Montejo in the photo are DOST XII Regional Director Dr. Zenaida P. HR Laidan (left) and DOST Asst. Secretary for Countryside Development Dr. Urduja A. Tejada. (Photo by Gerardo G. Palad/Text by Framelia V. Anonas, S&T Media Service)

supplements, handicrafts, and personal accessories, among others. It also has an integrated payment system that is safe for clients in and out of the country.

Through the OneStore, SETUP adopter SMEs can now reach and compete against those in the local and global markets.

In closing, Montejo shared that DOST will continue to bring technological solutions and innovations to the many pressing problems in the country even beyond 2016.

Globally recognized Halal food industry

Aside from SMEs, DOST XII is involved in the growth of the Halal food industry in the country.

During the SNT, Dr. Laidan described the importance of Halal industry in the Philippine economy. According to a Thomson Reuters report in 2013, the Halal related expenditures of the Muslims reached US$2 trillion and is expected to reach US$3.7 trillion by 2019. The country, with its more than 10 million Muslim population, can easily get a significant chunk of the Halal market.

Halal is literally translated as "permissive" food, acts, services, and products that Muslims can avail of. Its opposite is "haram" or products that are not permitted to be taken or used.

DOST XII's Halal testing laboratory secured its own Philippine Halal logo, which, according to Laidan, "marked not just our readiness to assist our local manufacturers and exporters but also accentuated our commitment to boost up the Philippine Halal Sector."

The DOST XII Philippine Halal logo, which bears the global Halal logo on top of DOST's mark, assures consumers of

the integrity and authenticity of the Halal product. In addition, Laidan shared that the DOST Halal laboratory is able to pass and capacitate its personnel in adopting with the Organization of Islamic Cooperation-Standards and Metrology Institute for Islamic Countries.

Aside from local imams to facilitate the certification of the food as Halal, the scientific-based knowledge in food preparation that is accustomed to the Halal process makes the certification credible, Laidan said.

"When we launched our Halal logo, there were Koreans who approached us, asking permission if they could use our logo for their Halal products, and I asked why and they answered me that, if the certification would come from a Muslim certifying institution, that would make their products credible as Halal," explained Dr. Laidan.

Regional Development Council Meeting

Part of the tour is DOST's dialogue with the provincial government executives through the Regional Development Council meeting. The meeting was presided by Vice Governor Ernesto Matias and was amazed at DOST's technologies. During the special meeting, Secretary Montejo turned over a copy of the multi-hazard maps of the Province of Sultan Kudarat as well as copies of DOST RED book or the Reference for Emergencies and Disasters handbook where all local disaster-related information are compiled.

Later, Secretary Montejo shared his fascination over the civet cats and coffee - the latter considered globally as a gourmet beverage because of its unconventional but natural process of weeding through the best coffee beans.

Civet coffee beans in the region are essentially picked up from the grounds of Mt. Matutum, where several civets thrive by eating coffee cherries. These coffee cherries are not fully digested in the tropical cats' stomach and later on the beans are excreted by the cat. The beans are then picked up by the B'laan tribal people and process these into one of the most expensive coffees in the world.

According to Montejo, the civet coffee is a very promising product in the region which is known for boxing and its world-class tuna industry.

Montejo sees the global potential of the civet coffee as long as local industry players would be able to sustain the environment where civets are thriving. Previously, civet cats were hunted for their meat and for a particular musk that the felines emit which are used in perfumes.

Seeing the potential and impact in the ecosystem of the B'laan coffee growers' product, Montejo mentioned that DOST is looking for ways to adopt the civet's natural way of adding value to the ordinary coffee industry.

"We would like to investigate what happens inside the civet that adds value to the coffee," explains Montejo.

He also lauded how the burgeoning coffee industry turned around the lives of the B'laan tribes. He shared that developing the local coffee industry would provide a sustainable growth as the local enterprises are providing the indigenous people who produce raw coffee beans a stable livelihood aside from protecting the natural habitat of civet.

In a recent assessment, Mt. Matutum has a potential area of 250 hectares that are suitable to coffee production. A leading coffee maker sources out 35 percent of its coffee requirements from the province.

In closing, Montejo said that more promising technologies and services are coming to develop the country's industries including Sultan Kudarat's coffee industry. He promised that DOST will continue to develop technologies and knowledge that are locally significant but with global quality and standards.

A sumptuous Maranao feast greeted participants and special guests during the DOST XII Science Nation Tour.

Thriving activities in technology transfer, enterprise support, scholarship, and enhanced health and education tools, among others, are proofs that science is indeed hot in this land of the siling labuyo.

Science is Hot in Bicol Region

By JUDITH L. SABLAN
S&T Media Service, *DOST-STII*

On March 2, a team from the Department of Science and Technology together with national media representatives went on a three-day Science Nation Tour (Agham na Ramdam) in Bicol region. The tour showcased DOST's interventions for the academe, industries, and other stakeholders including the local government units and was aimed to make science felt by the people.

Bicolandia

Situated at the southernmost part of Luzon Island, Bicol region is known for its many natural wonders including the majestic Mayon Volcano. After much delay at the NAIA airport due to bad weather condition, the flight to Naga airport finally took off although it was a little bumpy. Meanwhile, the flight of other members of the SNT team was cancelled, forcing them to travel by land instead.

Combating malnutrition with Technology

First stop upon arrival at Naga airport was the Central Bicol State University of Agriculture (CSBUA) in Pili, Camarines Sur for the launching of the complementary food processing center which will start operation and production this year. This facility in CSBUA was set up as a medium-scale facility to augment the small-scale food processing facility already established in 2014 at San Agustin in partnership with the local government unit of Iriga City.

Bicol region showed high prevalence of malnutrition (30-39%) among children zero to five years old, with Camarines Sur ranking second among the six provinces in the region, according to the latest national nutritional survey conducted by the Department of Science and Technology's Food and Nutrition Research Institute (FNRI). Both facilities will produce complementary food blends and nutritional snack foods developed by DOST-FNRI specifically formulated for children to reduce malnutrition in the country. Research studies revealed that adequate nutrition during infancy and early childhood is critical for mental and physical health and attainment of full human potential.

After CSBUA, the SNT team proceeded to San Agustin, still in Iriga City to witness the operation of the small-scale food processing facility established in partnership with the local government unit. Since the start of the facility's operation in 2014, Iriga City saw a decline in the number of malnourished children, according to Iriga City Mayor Hon. Ronald Felix Alfelor.

Lone plastic manufacturing plant in Bicol Region

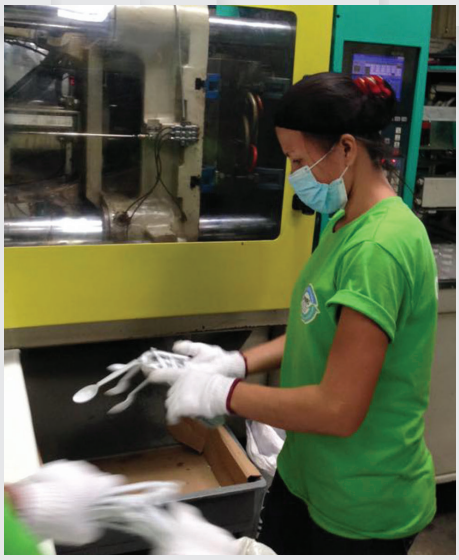
Next stop was La Trinidad, still in Iriga City, to visit the Prima General Merchandise, considered as the lone plastic manufacturing and recycling facility in Bicol region. Through DOST's assistance under the Small and Medium Enterprises Technology Upgrading Program (SETUP), the firm was able to acquire a computerized plastic injection machine in 2014. The firm was able to increase its product lines from 8 to 15 and penetrate a bigger market. According to owner Danilo Prima, sales increased up to 100 percent because of DOST's intervention while rejects were reduced from three to zero percent.

As part of the firm's ethical and social responsibility, Prima partners with elementary schools in Iriga City and practices "barter system" by exchanging school wastes like papers, cartons, and other waste materials with school supplies including computer units. Further, Prima also employs persons with disabilities to work in the production area especially in the recycling facility.

C.O.P. Pili Sweets and Pastries

Another word synonymous to Bicol region other than Mayon Volcano, sili, and Bicol express, is pili. The region is among the few places in the country where Canarium ovatum, locally known as pili, thrives. Various delicacies were developed by local folks out of this unique nut and is usually given as *pasalubong* by those who visit Bicol region.

From Camarines Sur, the SNT team traveled more than an hour and headed to Daraga City to visit C.O.P. Pili Sweets and Pastries, maker of different pili delicacies. Owner Cynthia Pereña started her business in 2006 with only one product line known as Wrapsody, a unique pili pastry made of pili sweet wrapped in a flour mixture. Faced with production constraints and other challenges, C.O.P. availed DOST's assistance



A worker at Prima General Merchandise inspects the plastic spoon produced from the computerized plastic injection machine. Prima was able to acquire said machine through DOST's SETUP which enabled the firm to achieve 100% sales increase and quality due to reduction in product rejects.

DOST Assistant Secretary Uduja Tejada (second from right) and DOST Region V Director Engr. Tomas Briñas (extreme right) ask questions to firm owners Mr. and Mrs. Danilo Prima during the project visit.

in 2013 and was able to acquire a heavy duty roasting machine and twin deck industrial oven through DOST's Small and Medium Enterprises Technology Upgrading Program (SETUP).

DOST's assistance resulted in increased production volume from 190 boxes to 17,160 boxes of Wrapsody plus 7,900 pouches of other products. At present, C.O.P. has maintained its markets in Legazpi and Naga cities as well as branches in four Rustan outlets, SM supermarkets, and in places as far as Hong Kong.

On the second day of the Science Nation Tour, the remaining members of the DOST SNT team whose flights were cancelled arrived from Manila by bus.

The whole SNT team proceeded to Taysan Resettlement Site in Legazpi City where families who previously resided in lahar-threatened and flood-prone areas around Mayon Volcano and were affected by typhoon Reming last 2014 were relocated. Families were relocated to Taysan for

Wilson C. Freo Jr. a DOST scholar from Sorsogon State College (right) receives the prize from DOST Assistant Secretary for Countryside Development Urduja Tejada and DOST Region V Director Engr. Tomas Briñas for winning the poster making contest at the DOST Scholars' Summit.

Volunteer barangay nutritionists work on the production of rice-mongo chips (inset) at the Iriga City complementary food processing facility in Iriga City, Camarines Sur, one of the DOST-assisted projects visited during the Bicol leg of the Science Nation Tour. The production of rice-mongo chips is a technology developed by DOST's Food and Nutrition Research Institute to help solve malnutrition especially among Filipino children.

safety and to prevent possible tragedy during calamity. Various DOST interventions were provided to the residents, including the deployment of STARBOOKS for Taysan Elementary School and different technologies for the Taysan Livelihood Center.

STARBOOKS

The Science and Technology Academic and Research-Based Openly Operated Kiosk Station or STARBOOKS, is a one-stop repository for science and technology and livelihood information. It is a stand-alone, on-site research and information kiosk that provides free access to information that was developed by Science and Technology Information Institute of the Department of Science and Technology (DOST-STII). It serves as a digital library that can permanently store information and materials. Internet connection is not needed by researchers using STARBOOKS. Content too can be updated regularly.

Training production and livelihood center

To provide livelihood for the families affected by the relocation, a training and livelihood center was put up by the Legazpi City government. Among the DOST interventions were the provision of technical assistance and training on handloom weaving and equipment for coco coir production, and sewing machines for abaca bags and other handicrafts.

Orientation-training on Project NOAH

DOST V conducted an orientation-training about Project NOAH among LGU beneficiaries and member agencies of the Regional Disaster Risk Reduction and Management Council at Hotel Ellis in Legazpi City. Project NOAH or Nationwide Operational Assessment of Hazards is DOST's response to the call of President Benigno S. Aquino III for a more accurate, integrated, and responsive disaster prevention and mitigation system, especially in high-risk areas throughout the Philippines. Bicol is known for its natural wonders like volcanoes and is often frequented by typhoons as it sits along the typhoon pathway. Project NOAH harnesses technologies and management services for disaster risk reduction activities offered by the DOST through PAGASA, PHIVOLCS, and the DOST-Advanced Science and Technology Institute (ASTI), in partnership with the UP National Institute of Geological Sciences and the UP College of Engineering. The training likewise includes forum on early warning system.

Launching of Bicol Integrated Dengue Vector Management Program

The departments of science, education, health, local government, and environment signed a Memorandum of Agreement to actively support and implement programs for dengue prevention and control through the Bicol Integrated Dengue Vector Management Program on March 4, 2016 at Ninong's Hotel in Legazpi City. The program is an integration and collaboration of various regional strategies for dengue prevention and control and aims to adopt the Global Strategic Framework for Integrated Vector management recommended by the World Health Organization. DOST's commitment is through the establishment and implementation of the Nationwide Dengue Vector Surveillance Program (NDVSP) trough OL trap and web-based information that serves as dengue early warning system. In recent

DOST Assistant Secretary for Countryside Development Urduja Tejada observes as a child twins coco fiber to be processed as coco coir product at the Taysan Resettlement Site in Legazpi City. DOST provided technical assistance for livelihood of these families in the form of equipment for coco coir production, sewing machines for abaca products and training seminars. At the resettlement site, kids sometimes work during their free time, as shown in photo, to help their parents earn income.

DOST Asec. Tejada signs the Memorandum of Commitment for the Bicol Integrated Dengue Vector Management Program (BIDVMP) while DOST Region V Director Engr. Tomas Briñas looks on. The BIDVMP is the integration and collaboration of various regional strategies to mobilize efforts towards vector control and preventing incidence of dengue and other mosquito borne diseases by various agencies such as LGU, DOH, DepEd, DILG, DENR, and DOST.

years, Philippines is one of the four countries in Western Pacific with the highest reported incidence of dengue.

DOST Scholar's Summit

DOST scholars including those who recently graduated were honored for their achievements during the Scholar's Summit held at Ayala Malls, Legazpi City. The event also featured career talk and testimonials of success stories by scholars as well as essay writing and poster making contests.

Regional Development Council Full Council Meeting

DOST Undersecretary Rowena Guevara presented DOST's significant programs in relation to the Eight outcomes implemented by the Department before members and representatives of the Bicol Regional Development Council held at the National Economic Development Agency (NEDA) office on March 5, 2016 in Arimbay, Legazpi City. A short press conference followed shortly where members of the media had the chance to ask Usec. Guevara about DOST programs and issues. Among the issues of interest was DOST's plan to set up free public WiFi nationwide.

DOST Undersecretary for S&T Services Dr. Rowena Guevara turns over to Albay Governor and Bicol Regional Development Council (RDC) Chairman Joey Salceda the DOST Reference for Emergency and Disaster or RED Book during the RDC Full Council meeting at the NEDA Regional V office in Arimbay, Albay.

Future regional economic development

Testimonials of partners and stakeholders revealed the success of DOST technology interventions and supported by data on sales increase and job generation. Hopefully, the Science Nation Tour heightened the consciousness of the general public about the indispensable role of science and technology in our society and will continue to support DOST programs and avail its services.

The Bicol leg of the Science Nation Tour highlighted the significant impact of DOST interventions in the region. Based on the reports and visits during the Tour, the region can indeed look forward to economic progress brought in part by DOST interventions.

SIPAG FIESTA ushers new hope for agri sector

By JOY M. LAZCANO
S&T Media Service, *DOST-STII*

DOST officials led by Secretary Mario G. Montejo came in full force during the SIPAG FIESTA at the DOST-PCAARRD office in Los Baños, Laguna.

When farmers have very productive harvest, they usually hold big celebrations for thanksgiving. Because of the festive celebration, this event is usually described as "pista" or "fiesta" because of the food and activities galore that usually mark fiestas or feasts of patron saints which are of Filipino tradition.

Thus "fiesta", when combined "sipag" or productiveness, signals the celebration of farmers' celebration for abundant harvest because of productivity spurred by a year-long hard work.

Last March 2-4, the Department of Science and Technology through the Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (DOST-PCAARRD) held the S&T Programs for Agri-Aqua Growth Farms and Industry Encounters through Science and Technology Agenda or SIPAG FIESTA at the DOST-PCAARRD facility in Los Baños, Laguna.

The event highlighted all the significant DOST programs and projects on the aqua and agriculture sector. These programs and projects are tailored to specific segments of the industry to improve their competitive edge and enhance their productivity especially in this time of extreme climate conditions.

According to DOST Secretary Mario G. Montejo, the event was designed to be more appealing, engaging, and participatory, as it embodies PCAARRD's commitment to make science and technology (S&T) work as a precursor of rural economic growth through the Council's major program, the Industry Strategic S&T Program or ISP.

Smart farming

The unpredictable climate has caused problems in global food security, which led agriculture industries to look into the potentials of integrating cutting-edge S&T into agriculture. With the Philippines among the most affected in terms of global food shortage, PCAARRD has set in motion a program to help solve this.

Buntings were all around while mild weather throughout the environs of Los Baños suited well with the SIPAG FIESTA mood.

Since 2014, PCAARRD has been supporting the program Smarter Approaches to Reinvigorate Agriculture and Industry in the Philippines or SARAI for small producers of rice, corn, coconut, banana, coffee, and cacao.

SARAI addresses the impacts of Climate Change in the aforementioned crops using state-of-the-art technologies, which will provide information on yield probabilities in varying climates.

These technologies are Automated Weather Stations, unmanned aerial vehicle, remote sensing, crop modeling, information and communications technology, and other decision support system for water, soil nutrient, and pest management.

The program consists of five project components on crop forecasting and modeling, environment characterization, development of knowledge portal, capacity building, and an agricultural consortium for its sustainability.

According to Karen Burdeos of UP Los Baños (UPLB) , crop forecasting aims to establish a database that will determine the best possible time to plant specific crops with a windfall of returns for farmers engaged in subsistence farming or farming for the family's daily sustenance.

"The program aims at building the capacity of our small farmers who do not have enough means to sustain high yields because of several factors," explained Burdeos, adding that irrigation needs to be resolved in the agriculture sector. Close to 50 percent of the small farmers are dependent on rainfall to irrigate their farms.

Mang Damian, a small farmer from Nueva Ecija, agreed. Mang Damian's five-hectare rice fields do not have an irrigation system. He said that he would have to run a small generator set to tap water from a river a few meters away from his farm. A ricefield needs some 200mm of water for it to grow accordingly.

"Kapag gumamit ka ng makina (generator set) krudo naman ang kailangan mo," he said. (If you will use a generator set, you have to use diesel fuel to run the generator).

That is why the rainfall and climate data are important to determine the highest probability of yield in a year.

"We are looking at relevant climate data on planting rice beginning in the last 30 years," Burdeos said. The climate, rainfall and cumulative rainfall data are historical data that are obtained from DOST's Philippine Atmospheric, Geophysical, and Astronomical Services Administration which provide a reference on the rainfall activities per region of the country.

Climate is one of the major factors that affect the production of rice in the country. In the last few years, the country has suffered stronger typhoons which stymied the production of rice and resulted to billions of losses.

The program will also get data on soil especially its moisture, nutrients and other factors affecting its productivity; and use decision support systems that will provide an estimate of the yield projection for rice and corn crops.

continued next page

DOST secretary Mario G. Montejo checks out the various crops, programs, and the mouth watering native lechon that were displayed during the SIPAG FIESTA.

Through the Decision Support System for Agrotechnology Transfer or DSSAT, data on several rice varieties will be put on a database, which will be used as data in forecasting yields of particular rice varieties.

Marlyn Yere of UPLB explained that the genotype, which can be compared to a human's vital statistics, shall be uploaded to the software for benchmarking. This will then be calibrated in order to come up with the computed yields based on parameters such as climate condition and soil attributes.

"This technique is being used by big agriculture companies to project the yields of various crops," Yere said. "This could help the farmers make a projection of how much they will earn even before they could start planting rice."

Another problem that hampers the abundance of harvest is the pest management for small farmers. Through the Smart Pest Identification, a mobile application pest identification system, farmers can just take photos of the pest and upload it to the app which will then produce information on the insect along with appropriate management protocols.

During SIPAG FIESTA's opening of exhibits, DOST Secretary Mario G. Montejo added that Project NOAH or the Nationwide Operational Assessment of Hazards will complement the smart farming program. He hinted on the vertical integration of the high-resolution map technologies and said that disaster preparedness tools can be used by other institutions to further develop its research.

"What you are seeing around you are the products and services that DOST-PCAARRD and its partners have developed for the last six years," said Montejo. "It is now possible to think of food stability in the country as an attainable concept if we are truly using science and technology for development."

Moreover, in recent developments, DOST was able to complete its multi-location field testing of the carrageenan growth enhancer.

The product, which is made from carrageenan, improves rice resistance to pests and increases yield up to 25 percent.

Livestock

The Science Department also made significant a project on livestock by introducing efficient livestock productivity. Among them is the production of goat meat, now becoming a buzzword especially among health buffs.

However, the goat industry is mostly dominated by backyard raisers which are seen as one of the factors to its meager 3.67 million heads, dropping by 0.58% in 2014.

Productivity in livestock production is also one of the many programs under PCAARRD'S SIPAG FIESTA.

Moreover, the industry has seen a continuous decline since 2010, partly due to the limited knowledge of goat raisers on efficient production. Through the GOAT Industry Strategic S&T Program, DOST attempts to address the gaps and potentials of the country's goat industry in a holistic way via online goat courses at www.e-extension.gov.ph/elearning, among others.

The training for FLS beneficiaries on breeding and proper feeding of does, addressed the problem of low dam performance. As of November 2015, conception rate has increased from 75% to 87%. This exceeds the target of 81% for 2015. Also, to address the lack of access to breeder bucks, DOST introduced the use of artificial insemination (AI) using semen from exotic breeds. It also refined the protocol on goat AI and enhanced the semen extender mixture, Semex.

This protocol was later institutionalized with the Unified National AI Program of the Department of Agriculture, which formerly catered only to cattle and carabao. As of November 2015, 214 technicians, 485 farmers, and 81 entrepreneurs have been trained in any of these required trainings: AI service provision, basic reproductive physiology and AI administration, or AI business aspects. Because of these, 1,765 does (out of 2700 targeted does) were inseminated in the six regions, producing 875 additional kids. The infusion of quality genetic materials in these smallholder farms thru AI, led to the increase in average birth weight by 43% (1.5 -2.25kg) and slaughter weight by 80% (15kg to 27kg).

Hog raising is also one of the critical sectors needing science interventions inspite of its huge progress.

The local hog industry is continuously saddled by low sow productivity, high mortality rate, and lack of native pig genetic resource conservation.

To address these concerns, PCAARRD has developed the program on high mortality rate by developing six LAMP (Loop-mediated isothermal amplification) protocols for common swine respiratory and gastrointestinal pathogens causing diseases such as *Pasteurella multocida, Haemophilus parasuis, Actinobacillus pleuropneumoniae, Cryptosporidium sp.*, *Salmonella sp.*, and *Porcine Epidemic Diarrhea* (PED) Virus. The LAMP protocols are translated into diagnostic test kits that detect at the soonest time possible any presence of pathogens that cause diseases. It also developed the application of 10 gene marker protocols that will help in improving growth rate, size, meat quality and the capability to screen genetic birth defects and resistance to diseases.

Aside from these, PCAARRD has programs on agricultural equipment developed by local fabricators to boost the productivity of small farmers with limited access to agricultural equipment.

Truly, as the culmination of all the research and development initiatives aimed at making the local agriculture sector become competitive amid the challenges and opportunities in the local and global agriculture community, SIPAG FIESTA ushers in new hope for industry players and small farmer groups who stand to benefit from all these. And as they reap the success of these R&D initiatives, so does the whole nation stand to benefit from the programs of PCAARRD.

High school students get a chance to take selfies with PCAARRD's mascot Juan SIPAG.

A cat's tale

kopi.luwak.civet

By ARISTOTLE P. CARANDANG, PhD
AND JOY M. LAZCANO
S&T Media Service, *DOST-STII*

The local coffee industry in Mt. Matutum would provide a sustainable growth as the local enterprises are providing the indigenous people who produce the raw coffee beans a stable livelihood. This is aside from the locals' protection of the natural habitat of civet.

Once upon a time there was a cat that lived in a mountain. Nocturnal as it was, the cat roamed around the mountain when everyone was restfully sleeping. It picked on ripe coffee cherry relishing on its succulent flesh. Sadly, this cat cannot digest the beans and leave them on the forest floor as part of their poop.

Many years passed and the cat's descendants did not change their habits. And then, people of this generation have found a good use for their refuse; exclaiming in amazement "Are you the coffee cat?"!

Civet coffee

This is the extraordinary tale of ordinary folks and their now precious cat commonly known as civet cat (*paradoxorus philippinensi*) or "musang" or "alamid" to some. They have been delivering raw materials for an extraordinary brew. From the civet's excrement, the coffee has now become a gourmet product that has started to attract international recognition.

"Very promising talaga itong civet coffee (Civet coffee is really very promising)," according to DOST Chief Mario Montejo.

"Imagine the same coffee bean which costs P600 per 100 kilograms is sold around P8,000 once the civet digested and excreted it."

Meanwhile, brewed civet coffee ordinarily costs P350 per cup in the Philippines.

Today, one of the brands for civet coffee in southern Philippines is Greentropics – a micro enterprise supported by the Department of Science and Technology Region XII. Greentropics manufactures high-quality arabica and civet coffee in the region. According to Greentropics CEO Fred Fredeluces, his venture into the business was

brought about by his immersion in the tribal communities, empowering them through various livelihood programs. During his initial runs, he had problems with his production for lack of better equipment to process the coffee beans.

Consequently, the quality of the products suffered as his worn-out machine was not able to keep up with the production.

He then sought the assistance of DOST XII and went through several trainings and seminars, Manufacturing Productivity Extension Program consultancies, product labeling, laboratory analyses, and plant layouts among others.

According to Dr. Zenaida Haji Raouf Laidan, DOST XII Director, the regional office granted to Greentropics P900,000 in equipment upgrading including moisture tester, date stamper, automated coffee roaster, automatic filling machine, sorter and coffee grinding machine.

Fredeluces said that through the DOST assistance, his production grew while the tribal community of B'laan that provides the raw coffee beans for his business has been able to live a more decent life. Fredeluces buys coffee beans from the community at more than P3,000 per 100 kilos of coffee beans, a much higher price compared with P1,000 at same weight by former buyers.

In addition, he said that the families from the tribe are now able to have a complete meal everyday and are capable of sending their children to schools.

The B'laan community's increased knowledge about civet cats changed the people's lives and also proved beneficial for sustainability concerns of both the civet and the mountain, which has been declared a protected area.

B'laan and Mt. Matutum

In Mt. Matutum where the B'laan people live and peacefully coexist with what Mother Nature has provided, civet cats roam freely as they have for generations. In the past, however, the cats are part of their food

(aside from the B'laan there are a number of IPs in the area).

The B'laans used to hunt the civet cats not only because they form part of their diet but also because they were also considered pests. The B'laan people live along the slopes of Mt. Matutum located in South Cotabato province in Mindanao. It is north of Polomolok and north, northwest of General Santos City.

B'laans continued to hunt civet cats until they learned of the huge potential in terms of profit that civets can give through the now famous civet coffee –highly prized by coffee connoisseurs.

Mt. Matutum, an IP ancestral domain, is one of the major sources of Arabica coffee in Mindanao. The other two are parts of Mt. Apo shared by North Cotabato and Davao Del Sur and Mt. Kitanglad in Bukidnon. Mt. Matutum also boasts of its Robusta coffee variety.

Copying civet process via S&T

With civet droppings considered as the most expensive coffee in the world, it is indeed interesting to find out about the cats' natural process of digesting coffee beans. That, plus how to turn the ingested beans into a flavorful beverage is something that DOST would want to study in the future.

"We would like to investigate what happens inside the civet that adds value to the coffee," announced Sec. Montejo.

He added that developing the local coffee industry would provide a sustainable growth as the local enterprises are providing the indigenous people who produce the raw coffee beans a stable livelihood. This is aside from the locals' protection of the natural habitat of civet.

Montejo revealed that he called Natural Resources Secretary Ramon Paje to tell him of the "good things that I have found out when I came here. We plan to return so I can let him see it for himself."

PTRI has come up with solutions to revitalize the local textile industry. Weaving all of these together, the Philippines becoming a TELANation is just a stitch away.

Going TELA Nation: Solutions have to come from us

By FRAMELIA V. ANONAS
S&T Media Service, *DOST-STII*

"Solutions have to emanate from within us: they (solutions) must be Filipino-centric, responding to the needs and wants of Aling Maria and Mang Juan," Secretary Mario G. Montejo sparked the audience's interest with his down-to-earth advocacy.

Participants to the DOST-PTRI's Stakeholders' Conference titled "Filipino-centric Solutions with PTRI's TELA Nation" were all ears as the Secretary acknowledged that the PTRI is on its transitioning days towards its 50th Founding Year Celebration in 2017.

Secretary Montejo recalled the recent past when the textile and garments industry hit rock bottom. Now PTRI is able to include fabrics with 20-40% indigenous yarn blends compared with the previous 5% when indigenous yarns were produced using antiquated machines and technologies.

A local brand manufacturer and proponents have already expressed support and interest.

Encouraging the local textile industry, Sec. Montejo invoked the characteristics of the ASEAN Economic Community as parallel to the visions of the S&T sector, such as: 1. highly integrated and cohesive economy; 2. competitive, innovative, and dynamic ASEAN; 3. with enhanced connectivity and sectoral Cooperation; 4. resilient, Inclusive, people-oriented and people-centered ASEAN; and 5. global ASEAN.

"As PTRI likes to say, beyond looks, beyond the term of our projects and programs, beyond our tenure in government, we are of the firm belief that these innovations, founded on shared aspirations, through science and technology will endure and take a life of its own." he concluded.

Signature campaign textile advocacy

"I went from door to door to door to door...I've spoken to the giants...I can name drop until I drop!" Jean Goulbourn, Silk Cocoon president gushed.

Her stories from her experience as advocate of local textiles and fabrics electrified the audience, as she chronicled her tale from New York to Europe, from Donna Karan to Fendi and in her battlecry against mental illness and depression.

"I aimed for the stars not for the money," she said frankly. While in the fashion industry, Goulbourn proposed proactive solutions and strategies to the young fashion designers to promote cultural heritage of their respective countries and the ASEAN community.

She recommends the following:

1. There should be exchange program of students in the fashion schools with other ASEAN member countries.

2. Each ASEAN country can host three fashion graduates selected by a committee to participate in a fashion parade (following the highest standard in the selection committee). "Let them come to me and let them cry over one-fourth inch of mistake on a pattern," she said, revealing her yardstick of quality work.

3. Two professional retail brands from each country should showcase products inspired by the cultural heritage. She suggested that local brands like Bench should get Philippine fabrics straight from the weaving communities in Ilocos and Tacloban. Companies may provide weavers with machines so that weavers can work for four hours and then get paid fairly for their labor because, she says, "nothing is for free...free does not get you too far."

"We go to Bench…Why not and you all, please sign that you want BENCH to go Local!" she said, facing the crowd. "Do I get your signatures? "

The audience cheered. She continued, "Stop talking local. Act on it. We talk too much."

4. There should be merchandising back-up and sponsorship of a partner garment manufacturer and retail outlet for all the fashion entries.

Merchandise should be available for retail. "Don't get addicted to the dream. Don't get too egoistic. Be fearless," she said.

Explaining further with each item on her presentation, she moved the crowd to action and shared them high spirits on how to promote appreciation of the textile cultural heritage.

When asked what she will do to revitalize the textile industry and how she is going to do it, if she was the government, she quipped, "Through youth education and scholarships, sound budget allocation from the government to machinery, international collaboration, expanding again to the ramie fabric, and continuous exploration of the fibers dipped on pulverized Mother of Pearl shells."

She has high hopes that the textile industry will stand out with its local sheen,

Photos by Gerardo Palad

specifically targeting the local brands to genuinely patronize the country's textile and weaving communities.

"We must mentor the young. Tell them the truth. Online sales are fantastic. Produce good quality," she added.

She wished there were somebody who uses the powdered Mother of Pearl from Cebu. "This will set us apart. The luster, the sheen will show...the thread will glow," she added.

The signature campaign came in as a petition paper for Ben Chan to go local --- particularly on Philippine fabrics. The audience signed on 17 papers for Goulbourn to forward to Ben Chan in a meeting.

Social Entrepreneurship

Anya T. Lim, managing director of the *Anthill Fabric Gallery, reckoned the challenges of being a social entrepreneur, particularly in bringing the Philippine textiles to the mainstream market, namely: 1) low demand for handloom products, 2) undervalued product, 3) no enabling environment for women or younger generation entrepreneurs, 4) no market access, 5) lack of cultural transmission continuity that leads to loss of traditional identity (corollary, no food on the table due to less income generation among the weaving communities).

As a social entrepreneur herself, she said that social enterprises are for profit organizations that use business strategies

to address social issues. Profits in social enterprises are reinvested to create positive social impact, she said.

She introduced their company *Anthill, a fabric gallery for community enterprises which hopes to bring solutions to cultural degradation and economic sustainability in the weaving industry.

"We preserve the weaving culture and our weaves are our second skin," she emphasized. The company's clientele includes young professionals, private companies, hotels and resorts, cafes, schools, and government agencies.

The company is right on track with its mission of keeping regional Filipino craftsmanship alive. The company's neckties and scarves reach local and overseas markets via retail stores, online retail, catalogues, and distributorship. *Anthill's product line includes fabrics, apparels, non-apparels, plush toys, and customization.

She reiterated that social entrepreneurship has to be "an innovative disruptive solution to a social problem that provides sustainable profit and has a sustainable purpose".

Moreover, *Anthill's corporate social responsibility is to continue the weaving culture in the hands of the young.

Revitalizing the textile industry

"The platform is there, and we are posing the challenge to the MSMEs to rise to the occasion so we may all move toward sustainability," said Nora B. Mangalindan, chief of PTRI's Research and Development Division.

PTRI has various notable projects carried out by its Innovation Center for Yarns and Textiles (ICYT), Geotextile, Natural Dyes, and Handloom Weaving. Vital in accomplishing projects are new facilities such as the carding machine (described as the "heart of the spinning processing), the speed frame, and the spinning frame.

There is also such a thing as "innovative yarns" which are described as "not commonly found in the market" because it carries blends of pineapple, abaca, cotton, and banana and a lot of successful outputs," she added.

Mangalindan also presented the various stages from fiber to textile to garments production. She discussed the processes - from extracting of raw fibers to degumming, spinning, weaving/knitting, finishing, and finally to sewing.

Acquiring these technologies, PTRI reported that, after the renovation and upgrading of the ICYT, the Center's processing jumped to an 800% percent high in spinning output in a three-year period. Meanwhile, yarn count also increased by 177 percent.

The comparative cost of Commercial and ICYT Yarns yielded to :

	Commercial (Php/Kilo)	ICYT (Php/Kilo)
Pure Cotton	Php 196.16	Php 259.98 65/35
Polyester/ Cotton Yarn	Php 130.00	Php 206.03 80/20
Cotton / Abaca	Php 339.41 80/20	
Cotton / Pineapple	Php 265.85	

Mangalindan also revealed the burgeoning geotextile industry and modernization of PTRI's Geosynthetic Testing Facility. Some popular geotextile products are not wearables, she said, such as coco coir, geonet, geogrids, and geomembranes used in construction, automobile, aviation and ports.

Upgrading the Geosynthetic Testing Facility led to lowering of testing fees, removing freight cost and duties required, shortening turnaround time, and conserving revenue. In this light, PTRI signed a Memorandum of Agreement with the Department of Public Works and Highways from 2009 to 2014 and the Philippine Ports Authority in 2015.

PTRI encourages and involves communities as production hubs and competent enterprises to fuel the supply chain and serve as the supply chain themselves.

The Institute is in charge of R& D on nanotechnology or nano dyes where dyes and colorants are further used in different applications. Researches are in collaboration with DOST sister-agencies and government agencies like DTI and PHILFIDA.

Currently, there are 10 established Handloom Weaving Innovation Centers with training programs. The self-sustaining Centers are accessible at the ePortal for easy searching of dye-source producers, dyers, weavers, entrepreneurs, and enthusiasts from the weaving and textile industry worldwide.

The PTRI also gives focus on upscaling and expanding the production and application of Philippine natural dyes (NatDye) which has a farm-to-market platform. Thus weaving together the established NatDyeing facilities, identifying the NatDye production hubs, the NatDye Center at PTRI, the Textile and Dyes ePortal and the upscale NatDyeing and printing programs ensures a harmonious pattern towards accomplishing PTRI's goal of sustaining the supply chain in the market and eventually in the NatDyes community.

Pagalanggang National High School in Dinalupihan, Bataan

How STARBOOKS disconnected a Bataan school from connectivity problems

By ESPIE ANGELICA A. DE LEON
S&T Media Service, DOST-STII

A research tool for students that does not need Internet connectivity, in an area where Internet connection is intermittent, certainly creates wonders.

On August 14, 2014, Pagalanggang National High School in the municipality of Dinalupihan in Bataan acquired two units of STARBOOKS from the Department of Science and Technology's Science and Technology Information Institute (DOST-STII).

STARBOOKS stands for Science and Technology Research and Academic-based Openly Operated Kiosks. It is the first digital science library in the Philippines and has a user-friendly interface. Most importantly, using it requires no Internet connection.

Developed by experts from STII, this digital science library contains tons of science and technology (S&T)-related materials in text, audio, and video formats from local and international sources.

"Talagang nagpupunta sila rito, excited sila" (They really came here, they were excited)," Leonora R. Santos, acting librarian, related as she recalled the days following the unveiling of the units at the school library. "Hinahanap nila kahit anong topic, basta magamit lang nila (They would search just any topic, just so they can use STARBOOKS)," she added.

Grade 10 Science Teacher Onofre Aquino recalled how his class was able to use it to find computations in energy that they were discussing in class. He also related how his students relied on STARBOOKS to find information that helped them undertake a particular task he assigned, which otherwise could not be found in their textbooks. Aquino also mentioned the usefulness of Britannica Ultimate Encylopedia which is also contained in DOST's digital science library. "All of these have been really helpful especially considering the fact that in our area, Internet connection is on and off," he said.

According to Grade 10 student Jun Jun Lopez, he and his classmates use STARBOOKS whenever they join a contest and their reviewers are limited. He recalled doing research on the different branches of mathematics, the pawikan, and malunggay, among others. His research on malunggay in particular, was for an investigatory project.

Students are not the only ones who benefit from STARBOOKS. According to Santos, a former teacher in the school and its current principal, also found information in STARBOOKS which they used for their theses.

"It's user friendly and easy to manage," Aquino said. "If a student forgets his or her password, as the Administrator, we can easily retrieve it."

Math teacher Wilfredo de Guzman agreed with Aquino that STARBOOKS is indeed user friendly. However, de Guzman lamented the lack of resources for Grade 7 students. Santos and Lopez likewise expressed their wish that new materials and data be added to STARBOOKS.

Which is why that very afternoon, Robelyn Cruz and Lloyd Mandapat of STII's information resources and analysis division, were at the school library to upgrade its two STARBOOKS units.

STII personnel constantly add new materials to STARBOOKS to update its content for users, including children or those in the younger grade levels. When the team went to Kuala Lumpur, Malaysia in October 2015 for the international Engineering Science Fair where STARBOOKS was exhibited, they observed that the interactive technologies were the ones that captured the attention and interest of the young exhibit goers.

With the upgrade, Pagalanggang National High School is now equipped with two STARBOOKS units containing K-12 supplement materials including an interactive courseware for Grades 1-7, as well as disaster preparedness materials such as the RED Book by DOST's Project NOAH, a reference guide for emergency and disaster.

RED Book contains information on the various hazards caused by earthquakes such as tsunamis and landslides, signs of an impending tsunami and landslide, hazards caused by volcanic eruptions like lahar and pyroclastic flow, the dangers of tropical cyclones, causes of floods and storm surges, preparedness guidelines before, during and after a calamity or hazard, and flood hazard maps of the Philippines' 18 major river basins.

The RED Book also features DOST-PHIVOLCS' "How Safe Is My House" checklist for earthquake safety of concrete hollow block houses in the country, guide questions for media reporters when covering a disaster, and emergency hotline numbers, among others.

Meanwhile, DOST-PAGASA's series of videos for disaster readiness has also been incorporated into STARBOOKS. The videos, dubbed BLTB or bagyo, lindol, tsunami, at baha, serve as easy instruction guides for the public to prepare themselves for typhoons, earthquakes, tidal waves or tsunamis and floods.

"Yung mga bata po ngayon, ayaw na halos magbasa sa libro. Gusto po nila yung one click lang, okay na sa kanila (Kids nowadays no longer like to read books. What they want is to get information in one click, that's what they prefer)," Santos said.

Indeed, with its additional content, STARBOOKS promises to become a more comprehensive, interactive, and enjoyable learning and research tool for students around the country, especially in places where there is little or no Internet connection.

STARBOOKS also contains books, magazines, journals, scientific and research papers, livelihood videos, and others. It is a recipient of the 2015 Outstanding Library Program of the Year Award by the Philippine Association of Academic and Research Librarians. STARBOOKS also earned the approval of the international community when the prestigious American Library Association presented it with the American Library Association Presidential Citation for Innovative International Library Projects in June 2015.

For inquiries on STARBOOKS, email dost.starbooks@gmail.com, starbooks@stii.dost.gov.ph or stiilibrary@gmail.com (S&T Media Service)

Aquino with Leonora R. Santos, acting librarian

Science teacher Onofre Aquino (left) and student Jun Jun Lopez sample the upgraded version of STARBOOKS. (Photos by Espie Angelica A. de Leon)

How the NAT was "won" with the help of STARBOOKS

By ESPIE ANGELICA A. DE LEON
S&T Media Service, *DOST-STII*

Chief Librarian Leilani Enopia (left) and School Principal Felisa C. Bravo beside one of the school's two STARBOOKS units.

Grade 10 students Jillyn May N. Lagos and John Jeremy E. Desipida.

Dr. Victoria B. Roman Memorial High School in the municipality of Pilar in Bataan Province has reason to be proud.

The school, which formally opened in 1998 with only two regular teachers and 46 first year high school students, ranked number 1 among more than 30 public high schools in the province, in the National Achievement Test (NAT) for Grade 10 in 2014 and 2015. It was the school's first time to grab the top spot. Previously, the school ranked no. 7 out of 33 schools in the NAT.

Administered by the Department of Education, the NAT involves a set of standardized tests which assess students' strengths, weaknesses, and achievement level in five major subjects. These include science and mathematics.

Chief Librarian Leilani Enopia believes that the Department of Science and Technology's (DOST) STARBOOKS was a factor that brought about this landmark accomplishment.

STARBOOKS stands for Science and Technology Research and Academic-based Openly Operated Kiosks, the first digital science library in the Philippines. It has a user-friendly interface and needs no Internet connection. It contains tons of science and technology (S&T)-related materials in text, audio, and video formats from local and international sources.

Developed by experts from DOST's Science and Technology Information Institute (STII), STARBOOKS is a recipient of the 2015 Outstanding Library Program of the Year Award by the Philippine Association of Academic and Research Librarians. STARBOOKS also earned the approval of the international community when the prestigious American Library Association presented it with the American Library Association Presidential Citation for Innovative International Library Projects in June 2015.

Dr. Victoria B. Roman Memorial High School became the proud owner of two STARBOOKS units in August 2014.

Since then, more students have been going to the school library to use STARBOOKS for their assignments, research, and projects, observed School Principal Felisa C. Bravo.

Grade 10 students Jillyn May N. Lagos and John Jeremy E. Desipida testifed that they do not have a single classmate who hasn't yet used STARBOOKS. In fact, they said, sometimes a lot of them go to the library at once to use the kiosks that it gets almost crowded in the room.

John Jeremy agreed with Enopia that STARBOOKS did play a role in their no. 1 ranking in the NAT. "Naging helpful sa amin yung STARBOOKS kasi po yung mga hindi namin gaanong na-ta-tackle na nasasabi sa amin ng mga teacher namin, dyan na po namin sila nahahanap (STARBOOKS became helpful because through it, we were able to search for and read up on topics which our teachers told us about but which we did not tackle in class)," he said.

Jillyn also related that STARBOOKS helped her personally when she joined the Municipal Children's Congress - Essay Writing in English Contest. To find the necessary information and prospective topic about children that she can tackle in her essay, Jillyn turned to STARBOOKS. She placed third out of eight participants from different public and private schools in the entire municipality of Pilar. Meanwhile, her schoolmate Darlene, who is in Grade 9, copped the second prize. Darlene also logged into STARBOOKS to help her develop her story.

The youngsters also turn to STARBOOKS to read up on topics not necessarily discussed in class, but which they are interested in. Jillyn, who wants to be an architect someday, reads up on architecture and watches videos about space. She also turns to cookery topics, not just for her lessons in Technology and Livelihood Education, but also to look for possible "merienda" dishes. Meanwhile, John Jeremy searches for information on simple programming as he wants to work in information technology. He shared that he was also able to use Britannica Ultimate Encyclopedia in STARBOOKS.

"Yung mga toggles niya po, madali pong intindihin. Lalo na po andun yung search bar niya, nasa gilid, mas kita po siya. And then pagbukas niyo po, makikita niyo sa bars kung video, o picture, o article yung bubuksan ninyo. Ma-p-print niyo din po lalo na kung mga articles at data (The toggles are easy to understand. Especially since the search bar is at the side, so it can be easily seen. And then, when you open it, you can see in the bars if what you are opening is a video, a picture, or an article. You can also print them, especially articles and data)," explained John Jeremy.

Jillyn added, "Hindi na kailangan ng pera para pumunta sa computer shop. Puwede na po rito sa library (You don't need to have money to do research in a computer shop. You can do it right here in the library)."

However, it is not just the students of Dr. Victoria B. Roman Memorial High School who have benefited from STARBOOKS. It is a great research tool for the teachers and parents as well. Bravo said that when they acquired the two units in 2014, one of the school's objectives was to get the students' parents to rely on STARBOOKS for livelihood ideas. However, this was not achieved.

Livelihood videos, aptly called DOSTkarte livelihood videos, are also available in STARBOOKS. To augment its collection, the STII staff is currently processing livelihood videos from the former Technology Resource Center for inclusion in STARBOOKS.

This time however, Bravo is compelled to fulfill this objective especially with the recent upgrading of the two units in the school. So now, their STARBOOKS units contain the newest additions into the digital library: disaster preparedness materials, interactive courseware, and supplement materials for K-12. Apart from these, it also contains books, magazines, journals, scientific and research papers, Britannica Ultimate Encyclopedia, and many others related to science and technology.

"Magpapatawag po ako ng PTA para i-introduce ko po na STARBOOKS has been updgraded (I will call for a PTA meeting so I can introduce to them the upgraded version of STARBOOKS), and there are new info there which they can use to improve their lives," said Bravo.

If the school succeeds with this goal, that would be another laurel reaped and another reason for Dr. Victoria B. Roman Memorial High School to be proud.

A portion of the school library. (Photos by Espie Angelica A. de Leon)

Native Food Delicacy. Department of Science and Technology (DOST) Secretary Mario G. Montejo (in native hat) tries one of the food delicacies produced by one of the exhibitors in SIPAG Fiesta. According to Sec. Montejo, innovations developed by PCAARRD in the agriculture and aquatic resources number to around 34 agri-aqua commodities that are unique and of world-class quality made possible by intensive research and development efforts of local scientists and engineers. (Text & Photo by Rodolfo P. de Guzman/S&T Media Service)

Best aggie researches in SIPAG FIESTA

By RICARDO R. ARGANA, ROSE ANNE K. MANANGHAYA
S&T Media Service, *DOST-PCAARRD*

THE PHILIPPINE Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) of the Department of Science and Technology (DOST) showcased the best of its agri-aqua research and development (R&D) outputs generated from 2010 to 2016 in an event dubbed as SIPAG FIESTA last March 2 to 4, 2016.

SIPAG reflects the vision and direction of S&T as laid down in the Council's Strategic Industry S&T Program for Agri-Aqua Growth (SIPAG). It also embodies the Council's commitment to Outcome One (Agricultural Productivity) of DOST in a bid to ensure that the fruits of R&D activities for the said sectors will be a blessing for every Juan, in keeping with the President's social contract.

Outcome One, the first of DOST's eight major Outcomes, seeks to provide the agri-aqua sectors with science-based know-how and tools that will enable the said sectors to raise productivity to world-class standards.

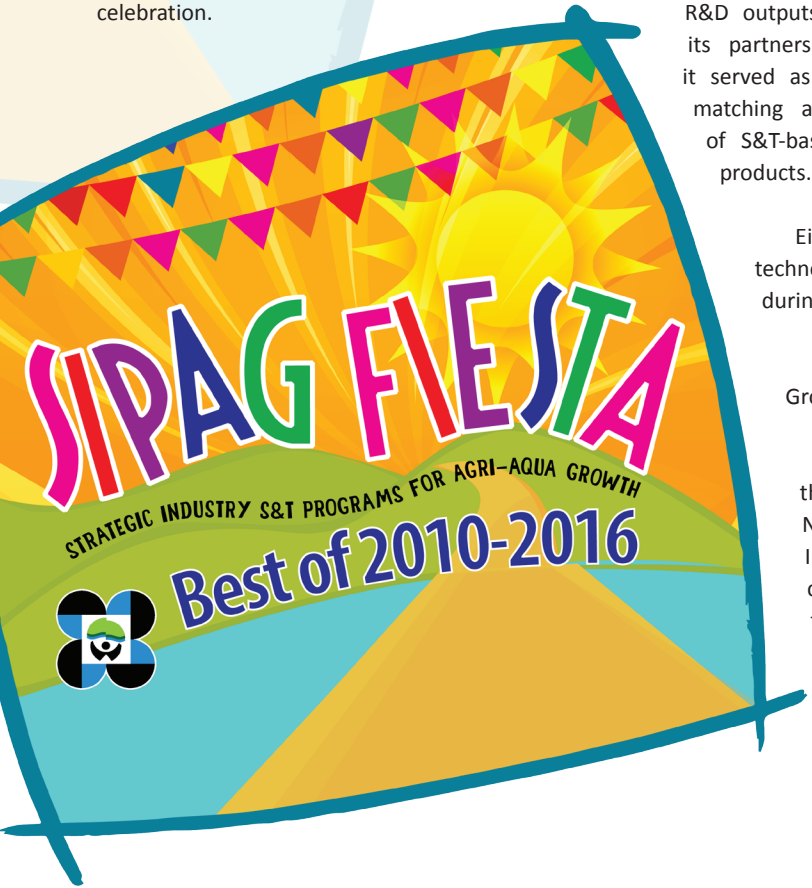
Meanwhile, PCAARRD's Farms and Industry Encounters through the Science and Technology Agenda or FIESTA, one of the Council's technology diffusion strategies, typifies a fiesta atmosphere created to enhance agri-aqua technology transfer and commercialization.

PCAARRD uses FIESTA as a technology transfer strategy, in as much as the venue can effectively showcase the various R&D initiatives of government research institutions in the form of agri-aqua technology or products. These products are certainly common in every Fiesta celebration, hence a profitable venue for micro, small, and medium enterprises.

Government research institutions engaged in agri-aqua concerns, have generated a wide array of technology that has either improved or provided significant outputs. Among such outputs are on alternative fuel, food delicacies,

Tilapia Cookies. Innovative food products like tilapia cookies are featured in the SIPAG Fiesta celebration which showcased the 34 agricultural commodities developed by PCAARRD through its intensive R&D programs geared at increasing agricultural productivity and upgrading technological innovations both in agriculture and aquaculture. (Text & Photo by Rodolfo P. de Guzman/S&T Media Service)

processed food products, wines, grains, fruits, vegetables, furnitures and even clothes—goods that complement a true fiesta celebration.



SIPAG FIESTA featured exhibits, techno forum, techno demo, and other ancillary activities that showcased the best R&D outputs of the Council and its partners. Most importantly it served as a venue for market matching and commercialization of S&T-based technologies and products.

Eight notable technologies highlighted during the SIPAG FIESTA are:

Carrageenan Plant Growth Regulator (CPGR)

Developed by the DOST's Philippine Nuclear Research Institute, CPGR is carrageenan extracted from seaweeds and further broken down using gamma radiation, a type of electromagnetic radiation comparable to X-rays. In multi-location trials conducted in Bulacan, Nueva Ecija, Laguna, and Iloilo, CPGR applied at low concentrations in rice has been found to enhance the yield by 15–30%. Early this year, CPGR were distributed for free to 650 farmers in Pulilan, Bulacan and will be field tested in 2,000 hectares of ricefield in Bulacan.

Improved Lakatan varieties resistant to Banana Bunchy Top Virus (BBTV) and Cavendish resistant to Fusarium Wilt.

The University of the Philippines Los Baños (UPLB) has developed a line of Lakatan plants mutated through irradiation. Currently, these Lakatan plants are showing intermediate resistance to BBTV. Disease spread was also observed to be slower, compared to ordinary Lakatan.

On the other hand, the program S&T Management Approaches against

Fusarium Wilt on Cavendish in Mindanao, has identified the Giant Cavendish Tissue Culture Variant (GCTCV) 218 and 219 as moderately resistant and highly resistant to Fusarium Wilt, respectively. GCTCV 218 and 219 are somaclones sourced from Taiwan. Somaclones are produced through genetic engineering.

Shrimp Biofloc technology

Shrimp biofloc technology (BFT), implemented by the University of the Philippines Visayas (UPV), uses a microbial mat, or multiple layers of microorganisms composed of a combination of bacteria, algae, protozoa, detritus, and dead organic particles. It can enhance feed conversion ratio, which is the measure of shrimps' efficiency in turning feeds into mass, resulting to bigger shrimps. Moreover, it can stabilize water quality, improve shrimp's nutrition, and control disease.

Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines or Smarter Agriculture.

Implemented by UPLB, Smarter Agriculture aims to help farmers and decision makers to come up with sound and science-based judgements under certain situations. The project, which started in 2013, aims to provide the agricultural sector with a decision support system – such as crop advisories, forecasts, and management - in dealing with climate change using advances in S&T.

Swine genomics

The application of gene marker was developed by the Philippine Carabao Center and Bureau of Animal Industry in partnership with the Accredited Swine Breeders Association of the Philippines. Gene marker, according to Warwick Crop Centre, is used to identify different qualities or features in the DNA sequence that can be used to differentiate individuals in a population. Ten gene marker protocols or ten official scientific records of scientific experimental observations associated with high litter size, fast growth rate, and meat qualities as well as seven markers for screening of genetic defects and disease resistance were optimized. The adoption of the gene marker technology by the swine breeder farms is expected to increase productivity and efficiency in terms of number of pigs weaned and total weight of pigs produced per sow per year.

Coconut Somatic Embryogenesis

Coconut somatic embryogenesis technology (CSet) is a tool for rapid mass propagation of superior genetic stocks for high yield, pest and disease resistance, and high value products. It is an alternative technique which involves the use of immature flowers, immature embryos, and plumule or the young shoot that grows from the seed of the plant.

The CSet project is funded by PCAARRD and is tested and evaluated by a group of researchers from the Philippine Coconut Authority (PCA), UP, Bicol University, and Visayas State University (VSU).

To date, more than 12,000 plumules were removed and started with tissue culture with 56% efficiency adopting the enhanced PCA-CSet protocol in seven upgraded/ equipped laboratories: PCA-Albay Research Center, PCA-Zamboanga Research Center, UPLB, UP Mindanao, Bicol University College of Agriculture and Forestry, and VSU.

Rice Mechanization Program

The Rice Mechanization Program is a P65M project expected to contribute to the reduction of rice harvesting and threshing losses from 4.2% to 1.8% in 2020. It will also help lower the losses from drying rice, from 5.8% to 3.8% in 2016.

The machines, once developed and pilot-tested, are expected to lower production costs and improve rice quality. Part of the Rice Mechanization Program is the development of harvesters, transplanters, and compact rice mills. These technologies were developed by the DOST's Metals Industry Research and Development Center and the Philippine Center for Postharvest Development and Mechanization.

Asexual reproduction of corals for transplantation

Corals asexual reproduction technology for reef restoration involves the collection of dislodged live coral fragments or "corals of opportunity" (COPs) and attaching them to coral nursery unit (CNUs) for quick recovery and regeneration.

A CNU is a metal frame with wires built to hold COPs. These are placed in shallower waters for the corals to grow before transferring them to the reef. Each CNU is designed to hold 500 COPs per batch and can be used several times a year.

This process is expected to increase survival rates upon transplantation in degraded coral reef sites.

Since its establishment in 2012, the Filipinnovation on Coral Reef Restoration Program of PCAARRD has already established 538 CNUs and transplanted 487,158 coral fragments. When the Filipinnovation program was completed in 2013, the National Coral Reef Rehabilitation Roll-Out Program continued the work using the same asexual reproduction technology ongoing in various sites across the country: Pagudpud, Ilocos Norte; Alaminos, Pangasinan; Bagac, Bataan; Subic Bay, Zambales; Puerto Princesa, Palawan; Anda, Bohol; Camiguin, Zamboanga City; and Kiamba, Sarangani. Overall, the two programs are now in 20 locations across 10 regions namely, Regions 1, 2, 3, 4A & 4B, 5, 6, 7, 9, 10, and ARMM.

Other products were also exhibited during the event.

Another highlight in SIPAG FIESTA was the opening of the PCAARRD Innovation and Technology Center (DPITC). As a technology diffusion platform, the DPITC will house a modern exhibition hub, a digital library, a conference facility, and a business hub, among others.

SETUP helps mill churn out quality feeds at lower cost

By GERALDINE BULAON-DUCUSIN
S&T Media Service, *DOST-STII*

IF YOU can't find it, make it. This is what prompted a group of poultry raisers 12 years ago to venture into what is now Qualimeal Feedmills, Inc., which was specifically set up to produce and guarantee their supply of quality feeds at less cost.

"Qualimeal was mainly established to supply stockholders and directors with whom some small entrepreneurs and growers, mainly swine growers, get their supply of feeds. Stockholders thus pay for their feeds and they then assume the responsibility to pay the feedmill. It does safeguard the feedmill to prevent possible occurrence of overdue accounts. Today, it serves other clients but through the directors," said by Teotimo L. Reyes, Jr., president of Qualimeal Feedmills.

In the past, feeds were sourced from various feedmills but the quality and price were not good, negatively affecting profits. "Quality" here entails attaining the desired weight of fattening swine in a certain marketable age; while for layers, it means attaining standard or even better in egg production even without nutritional supplements.

Back in 2004, with less than P3 million in capital, two office staff and six production workers, Qualimeal Feedmills, Inc. set out to produce quality feeds at lower cost. In seven years, the company acquired its own poultry farm with 20,000 heads of day-old-chicks. Of these, 7,000 were used for egg laying production, while the 13,000 were sold in the market.

But in 2013, Reyes learned from friends about the Department of Science and Technology's (DOST) Small Enterprise Technology Upgrading Program (SETUP) which supports local enterprises to enhance their production and operations capability by providing a package of assistance.

Qualimeal availed itself of the program and now vouches for SETUP's big help to the business.

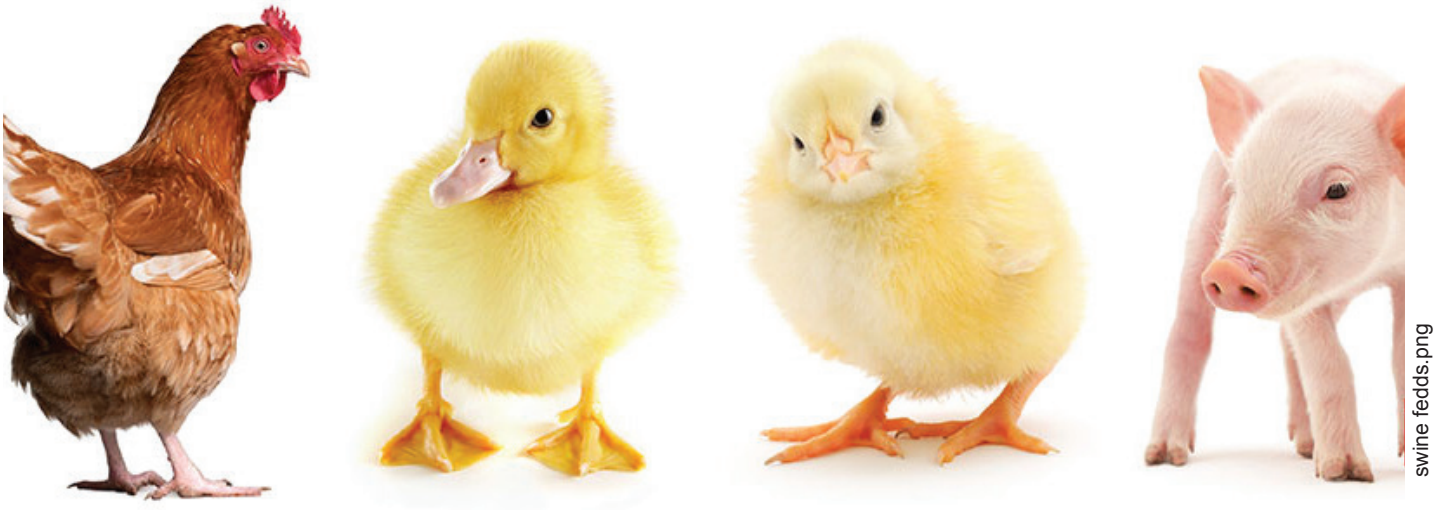
"Before SETUP, we produced 12,000 to 14,000 50-kilogram bags of poultry and swine feeds. Our mixer and hammer mills were capable only of producing half ton. But the assistance from DOST has greatly improved our entire production," says Reyes Jr.

Reyes credits the boost to DOST's SETUP assistance which consists of the following: 5-ton capacity hammer mill; 1-ton capacity feed mixer; feed hopper (4 units); feeder unloader (2 units); plus the Manufacturing Productivity Extension Program; and Energy Audit and Cleaner Production Technology.

The company's production has increased to 17,000 and even up to 20,000 bags per month and the overall operation's cost was cut down while efficiency increased. Sales improved by 25-30 percent.

One of the challenges is erratic supply and cost of ingredients like corn, soya and rice bran. These were countered with constant monitoring of sources, inventories, and analysis of common practices of suppliers.

Today, all stockholders and directors are product users, 75 percent for layers and 25 percent for swine. The office staff increased to five, plus 14 production workers, and 10 contractual personnel handling the loading and unloading of raw materials.



swine fedds.png

DOST, LANDBANK ink partnership for *OneSTore.ph* project

By ROMELIE JANELLE MARANAN
S&T Media Service, *DOST-STII*

(Seated, from left) LANDBANK Card & E-Banking Group First Vice President/Head Randolph L. Montesa, DOST Assistant Secretary for Countryside Development Dr. Urdujah A. Tejada representing DOST Secretary Mario G. Montejo, LANDBANK President and CEO Gilda E. Pico, and LANDBANK Branch Banking Sector Officer-in-Charge and South NCR Branches Group Head Ramon R. Monteloyola sign the Memorandum of Understanding for the OneSTore.ph Project last March 14 at LANDBANK Head Office in Malate, Manila.

The symbolic turnover of OneSTore.ph products to the board members of LANDBANK.

THE DEPARTMENT of Science and Technology (DOST) officially sealed its partnership with the Land Bank of the Philippines at the recent signing of a Memorandum of Understanding for the OneSTore.ph Project last March 14, 2016 at LANDBANK Head Office in Malate, Manila.

Initiated by DOST Secretary Mario G. Montejo and developed by DOST Region II, OneSTore is an e-commerce web application that provides a marketing platform for DOST-assisted micro, small, and medium enterprises (MSMEs) around the Philippines under its Small Enterprise Upgrading Program (SETUP). It offers customers an effortless shopping experience and gives retailers simple and

DOST II Regional Director Engr. Sancho A. Mabborang discusses the OneSTore.ph Project. (Photos by Gerardo G. Palad, S&T Media Service, DOST-STIII

direct access to the largest customer base in the country.

Under the MOU, LANDBANK will serve as the payment solution system of the OneSTore project through its ePayment Portal which will provide a secure and convenient payment platform while facilitating operational and cost efficiencies for seller-MSMEs.

In his speech delivered by DOST Assistant Secretary and Program Manager for Countryside Development Dr. Urdujah A. Tejada, Sec. Montejo stressed that DOST, as a strong advocate of hastening the country's transformation of smarter information society through the life-changing power of information and communication technology, is continuously making progressive strands towards creating a platform from which the nation can greatly benefit.

"The digital world is a booming market and quickly becoming the leading industry for investors. Various projects have been implemented in order to ensure that every Juan and Juana can have the capacity to access the Internet and the opportunity to foster personal and economic growth," Sec. Montejo said.

Meanwhile, LANDBANK President and CEO Gilda E. Pico mentioned that LANDBANK is grateful for the opportunity to be part of this breakthrough service which provides an online platform for MSMEs to promote and sell their products to both local and international markets.

"Through this partnership, we hope to go a step further than providing financial support by contributing to DOST's thrust to address another key challenge that Philippine MSMEs contend with - effective marketing thru technology," Pico added.

Unlike the traditional marketing system, OneSTore is a 24-hour, easy-access system where buyers have several products, as well as terms of payment, to choose from. Placing of orders will be facilitated by a very convenient door-to-door delivery system.

OneSTore addresses the common problem of MSMEs concerning the lack of adequate budget for their product promotions and marketing. Through the online marketing platform, MSME owners can upload and sell their products. The said platform will widen the scope of the MSMEs' target market locally and internationally, help deliver economic growth, and increase their business opportunities, hence its tagline "Reach more, Earn more, Grow more."

Why LANDBANK?

DOST II Regional Director Engr. Sancho A. Mabborang cited that DOST and LANDBANK share the same goals in different aspects - the reasons why they chose to partner with the said government financial institution.

"DOST and LANDBANK both aim to establish or develop the countryside and have an exclusive growth; capable of going global for our future hubs; possess the necessary technologies for e-banking services wherein we'd like to explore the possibilities of using their systems which are i-Easy Padala, iAccess, and weAccess," RD Mabborang added. "We are like puzzles; we are like meant to be and fit for each other."

LANDBANK is interested to take on a bigger role in promoting OneSTore.ph, make it the preferred platform for Filipino entrepreneurs, and explore the expansion possibilities of the online marketing channel where LANDBANK can provide financing support.

OneSTore had also partnered with Air21 as its official logistics companion cum product courier.

To date, OneSTore.ph already has around 143 successful transactions worth P530, 000 since its soft launch at the celebration of National Science and Technology Week last July 2015, and is expected to boom in the next months.

For interested buyers and for more information about the OneSTore Project, you can visit their website at www.onestore.ph.

Experts eye crucial role of HEIs in pushing PH halal industry

By ROMELIE JANELLE MARANAN
S&T Media Service, *DOST-STII*

(Front row, from left) DOST XI Regional Director Dr. Anthony Sales, Head Executive Officer of Office of Senator Cynthia A. Villar, Mindanao Development Authority Chair Secretary Luwalhati R. Antonino, and USM President Dr. Francisco Gil N. Garcia lead the ceremonial opening of the Halal Congress and ribbon-cutting ceremony for the Halal Poster and Product Exhibit (Photos by Romelie Janelle Maranan, S&T Media Service)

TO FURTHER address the various setbacks in the halal sector and the growing demand for halal products in the country and the global market, the academic sector is now being tapped to serve as a thrust for the development of a robust Philippine Halal industry.

At the Brunei Darussalam, Indonesia, Malaysia, Philippines- East ASEAN Growth Area (BIMP-EAGA) International Halal Congress last March 1-3, stakeholders from the academe, research community, industry, and the government sector from the member countries of the BIMP sub-region gathered to highlight the important role of Higher Education Institutions (HEIs) in advancing the halal industry in the country.

The Philippine Halal sector recognizes that research and development (R&D), as well as science and technology (S&T), are staples in the halal industry, but this is the first time for HEIs to be included in the discussions.

Halal is Arabic for any object or action that is permitted or lawful to use in accordance with the Sharia Law. Currently, halal is not only for Muslims, but is also a healthy choice for non-Muslims. The increasing demand for halal foods pushed halal as a driver for socio-economic growth.

According to University of Southern Mindanao (USM) President Dr. Francisco Gil Garcia, innovations in the halal production through the application of R&D and S&T do not only increase its competency, but also ensure the sanctity of this religious activity for the Muslims.

"As the country aggressively initiates its plan to develop its Halal industry, a parallel

effort should also be provided to HEIs to be integrated in the Halal value chain, especially now that the population of our Muslim brothers and sisters is projected to grow in the next years," Dr. Garcia added.

Meanwhile, Mindanao Development Authority Chairperson Secretary Luwalhati R. Antonino contended that with HEIs now fully on board, the halal sector can now focus on how the academe can contribute in halal development and promotion. The academe can include halal in the curriculum and recognize the crucial role of S&T and R&D in advancing this particular industry.

There is a dire need for more Halal or Halal Science Muslim professionals since it is a must for the Halal industry to be manned by devout Muslims, so there must be enough studies available in HEIs, experts say.

USM, as one of the premier state universities in the Philippines, has already started its initiatives by including halal information in the curriculum, as well as in research, extension, and production. It offers major studies in Halal Food Management and Technology for the first time under the Bachelor's Degree of Science in Islamic Studies. The university is also working out for the inclusion of Halal Science in the curriculum.

Department of Science and Technology (DOST) XI Regional Director Dr. Anthony C. Sales also mentioned that research, development and extension programs in the academe can significantly shape the competencies of the industry in terms of human resource development, establishing standards for production and logistics, laboratory services and quality assurance, and the socio-economics of the halal industry.

S&T also plays a big role in the technologies, laboratories, and facilities used by the industry, especially during production, testing, and certification of Halal products.

Aside from these, the congress also showcased the BIMP-EAGA and ASEAN cooperation through the "Big Brother Approach" as a strategy wherein HEIs and other halal stakeholders of ASEAN countries with a developed halal industry will share their respective expertise, experiences, and support to the HEIs of other countries for the advancement of the Halal sector.

"Our main goal is to pursue a unified, sustainable direction for and make Mindanao the halal center in the Philippines, and develop the Philippine halal industry that is at par with our neighboring ASEAN countries. Let us maximize all the opportunities that are coming to us, particularly through a research and development track," Sec. Antonino added.

The BIMP-EAGA International Halal Congress: An Academe Perspective, with the theme "Integrating HEIs in the Halal Value Chain", was a three-day event organized by USM, in partnership with the Department of Agriculture XI and XII, DOST XI, Department of Tourism, MinDA and Technical Education and Skills Development Authority.

In photo are (from left) Director of Commission on Higher Education-Higher Education Regional Research Center of University of Southern Mindanao Dr. Emma K. Sales, a representative from Thailand,Deputy Director of The Halal Science Center in Chulalongkorn University in Thailand Dr. SulidaWangchi, Secretary General of Standards and Metrology Institute for Islamic Countries (SMIIC) in Turkey Mr. Ihsan Ovut, Regional Director of the Department of Science and Technology XI Dr. Anthony C. Sales, Specialist at SMIIC in Turkey Engr. Yasin Zülfikaroğlu, and Chief of Communications Resources and Production Division of DOST- Science and Technology Information Institute Dr. Aristotle P. Carandang, organizers and speakers of the recent BIMP-EAGA International Halal Congress: An Academe Perspective.

Montejo bats for interactive website on food, health, and nutrition

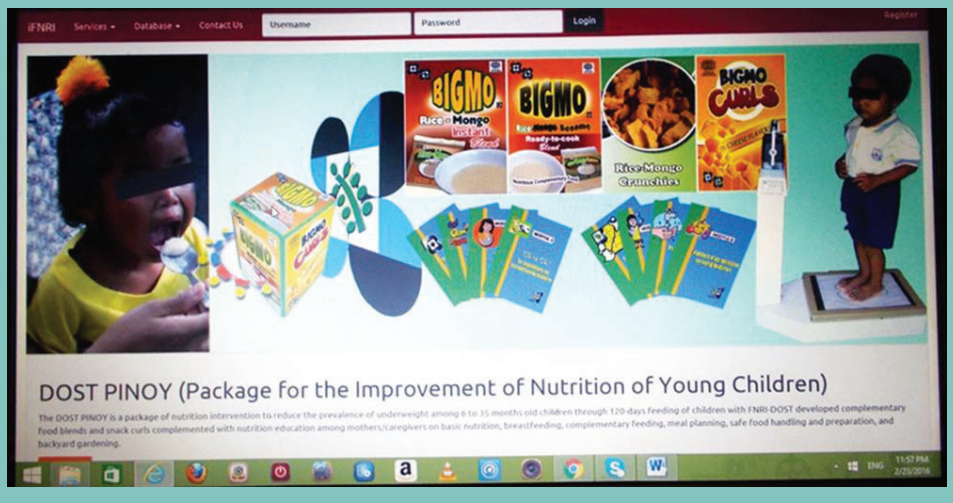
By ESPIE ANGELICA A. DE LEON
S&T Media Service, *DOST-STII*

DEPARTMENT OF Science and Technology Secretary Mario G. Montejo recently pitched the use of a website that enables users to get relevant information on food, health, and nutrition attuned to Filipinos. Developed by the Food and Nutrition Research Institute (DOST-FNRI), the website allows users to know their health risks, calculate their daily energy and nutrient requirements,track their food intake and physical activity, get the estimated energy and nutrient content of meals and recipes,upload their own recipes, make an appointment for professional nutrition counselling, and more, all at the same time.

Called the iFNRI website (URL: i.fnri.dost.gov.ph), it was launched February 23, at the Crowne Plaza Manila Galleria in Pasig City, ushering the harmonization of the Institute's various services and projects in one dynamic site.

With its user-friendly layout, easy to understand content, interactive features and software capabilities that allow data management and automatic data capture among others, the website is expected to make Filipinos better informed about health, nutrition, and wellness issues. At the same time, the website helps speed up the delivery of FNRI's programs and services to the public. Overall, it aims to help effect better health outcomes among the population, particularly in terms of solving malnutrition in the country.

"Digital health is one such phenomenon that is gaining momentum and continues to accelerate. iFNRI is a digital health alternative that provides us with a timely option to keep up with the rapidly changing times," said DOST Secretary Mario G. Montejo in his message delivered by DOST Assistant Secretary and Program Manager for Countryside Development Urduja Tejada.



iFNRI also enables users to know the quantity and type of food they can eat and the kind of physical activity they can do, calculate the costs of certain foods, get the nutritive value of more than 1,500 common food items in the Philippines, and find healthy recipes developed by FNRI.

Users may access and download health infographics, survey results and statistics on food consumption involving different food groupings and different population groups. In addition, users, particularly those involved in research, may also process their own data online.

Meanwhile, FNRI clients may use the site for easier tracking of the status of laboratory services. Those wanting to avail themselves of FNRI's laboratory services can also get information from the website including the prices of nutritional analysis of food samples.

In addition, the website offers data on FNRI technologies and products transferred both locally and internationally for commercialization. Among these are complementary food products, stabilized brown rice which has longer shelf life, low-fat and low-sugar ice cream, and noodle products.

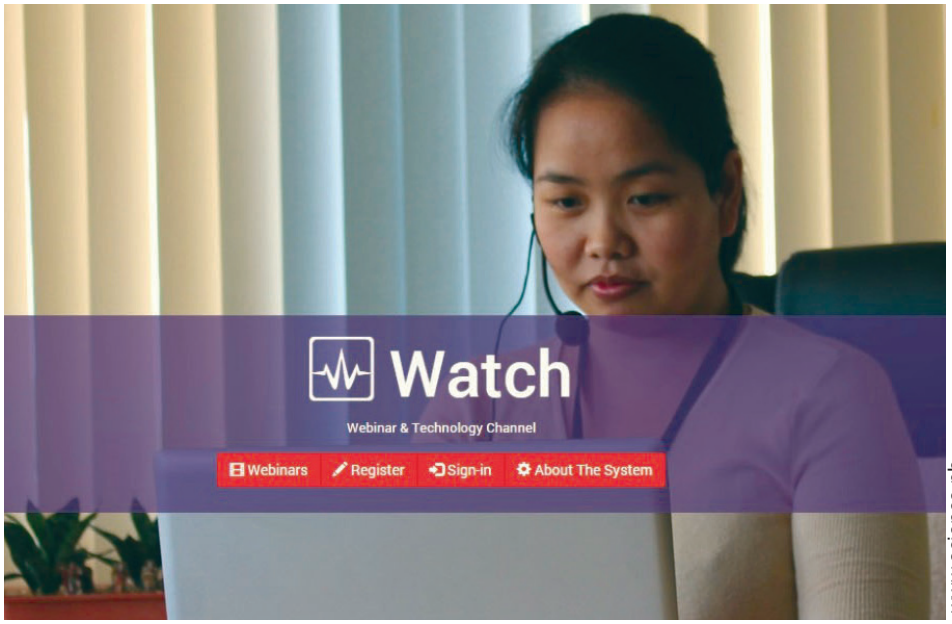
Also available are data on the delivery of DOST PINOY (Package for the Improvement of Nutrition of Young Children) throughout the archipelago. DOST PINOY, which is included in the national priority plans for 2016, is a package of nutrition interventionsfor children throughout the archipelago to decrease the number of underweight kids.

"Almost everyone uses the internet and owns a smartphone. The use of mobile devices is growing at a rate of 115 percent each year and the use of health and fitness mobile apps grew by 62 percent in the first half of 2014. This number was even bigger in 2015," said FNRI Director Mario V. Capanzana in his opening remark."This is not a trend. This has become an inevitable way of life," he added.

Capping the launching ceremony was a hands-on demonstration of iFNRI and a Question and Answer portion where audience members were tested on their knowledge of the website and how to use it.

DOST seminars now accessible online in real-time

By ROCHELLE L. CRUZ
S&T Media, *Service*



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DID YOU know that you can attend seminars even if you are kilometres away from the venue? No more long and inconvenient travel-- all you need is a computer and good internet connection. This is made possible through a webinar, or online seminar, which enables people to participate and learn at the comfort of their own homes or workplaces.

The Department of Science and Technology Region IV-A developed in 2011 the Food Safety Webinar Site to assist the Food Safety Inter-Agency Program (FSIAP) in promoting food safety in the region. The webinar site is a tool to enhance awareness of the CALABARZON community on the significance of food safety, including the problems and issues affecting it. Some of the webinars conducted include the Philippine Good Agricultural Practices Certification, Food Safety and Trade Issues, and Chemical Migration in Food Packaging Materials.

In 2015, the Food Safety Webinar Site was rebranded into the Webinar and Technology Channel or WATCH. Its coverage was broadened to include other S&T related topics such as biogas technology, metrology, and packaging and labeling.

So far, there were 27 webinars conducted, and most of these were related to food safety. Over 1,100 participants from the academe, private sector, and government agencies have attended the webinars.

To participate in a webinar, one should register first on the indicated registration page of the webinar. Registered users receive notifications of upcoming webinars either through text or email. Moreover, users can view previous webinars in the system.

The webinars also include participants' evaluation to generate feedback and suggestions on how to improve the webinar service. An electronic copy of Certificate of Participation is then sent to participants afterwards.

The MIS targets to conduct eight webinars about various S&T fields for 2016. WATCH website is accessible at http://region4a.dost.gov.ph/watch/public/.

Non-compliance to mass drug administration, reason for prevalence of elephantiasis - DOST study

By RODOLFO P. DE GUZMAN
S&T Media Service, *DOST-STII*

NON-COMPLIANCE TO mass drug administration is a serious obstacle in eliminating lymphatic filariasis, more commonly known as elephantiasis, according to a study funded by the Department of Science and Technology - Philippine Council for Health Research and Development (DOST-PCHRD). This non-compliance also serves as a reservoir for the parasite and permits recurrence of infection, added Professor Serafin O. Malecosio Jr. of the University of the Philippines Visayas and PCHRD research grantee.

Professor Malecosio presented his study entitled "Compliance Rate and Predictors of Non-Compliance to Mass Drug Administration (MDA) for the Elimination of Lymphatic Filariasis in Iloilo Province" during the Health Research Utilization Forum held on February 22, 2016 at the Eon Centennial Hotel in Iloilo City as part of DOST's Science Nation Tour.

In the study, Malecosio found out that there is prevalence of elephantiasis in 44 provinces, 21 of which are in Mindanao, 11 in Luzon and eight in the Visayas.

Elephantiasis is a parasitic disease caused by microscopic, thread-like worms that live in the human lymph system and is transmitted by mosquitoes. The effect of the disease is the swelling of the affected part of the body resembling that of elephant legs.

According to Prof. Malecosio, it was in 2007 that the first case of elephantiasis in Iloilo was reported and in 2008, the first round of the MDA was conducted to arrest the spread of the disease.

MDA entails administering a therapeutic dose of drug, usually in the form of tablets, to an entire population (barangay, town or province).

His study showed that non-compliance with MDA was a serious obstacle in eliminating elephantiasis, serves as a reservoir for the parasite, and permits recrudescence of infection.

His study zeroed in on Iloilo province composed of 42 municipalities and 1,901 villages/barangays with a total population of roughly 1.7 million. The study's population survey included individuals aged two years and above.

The study also revealed that non-compliance to MDA is associated with false knowledge of signs and symptoms, location of drug dispensing (either home or school), and people dispensing the drug --more often it is done by barangay health workers (BHW), relatives or friends. Noteworthy is the finding that the drug is dispensed more by BHWs (59%) than by midwives (29.9%).

www-cnn-com.jpg

Reactors to the study included Dr. Patricia Grace S. Trabado, provincial health officer; and Dr. Marie Jocelyn J. Te, medical coordinator for LF of the Department of Health Regional Office VI.

The health research forum also featured Dr. Renilyn P. Reyes, a training scholar in health research of the Western Visayas Health Research and Development Consortium (WVHRDC), who talked about the Effect of 4Ps (Pantawid Pamilya Pilipino Program) on Selected Child Health Indicators in Western Visayas.

Also presented during the forum was the health research innovation called the "e-HATID", an initiative of the Institute for Philippine Culture of the Ateneo de Manila University, by Dr. Dennis B. Batangan. In a workshop, participants had the opportunity to use the e-HATID, with Professor Christine C. Villanueva of the WVHRDC as facilitator.

The forum, featured in DOST's Science Nation Tour in Iloilo for the Western Visayas, was jointly organized with the Department of Health Region VI and the PCHRD through the assistance of DOST Region VI and in partnership with the WVHRDC. The event was held to promote a free exchange of research initiatives among medical professionals toward helping improve the delivery of health services in the country.

"The DOST, through the PCHRD has always been at the forefront of pushing health research in the field of drug discovery to a higher level as well as developing innovative health systems that would benefit Mang Juan and Aling Maria," stated DOST Secretary Mario G. Montejo during one of his press briefings.

High-level wellness products developed by DOST

By ADELIA GUEVARRA
S&T Media Service, *DOST-STII*

THE DEBATES have been fierce and challenging; they rouse one from the dark blankness brought about by this debilitating disease.

"We don't call it by its real name," a mother softly whispered. "We prefer to call it as the Big C," referring to liver cancer which her son has. Na Nena (not her real name) is one of thousands of sad witnesses to its crippling effects.

"It saps your spirit and strength; it leaves you hopeless and crying like a child," the 55-year-old fish vendor continued, slowly getting teary-eyed. "You know, we have tried everything. With our money fast running out, it's a relief to know that guyabano tea can help."

Mounting the evidences for folk medicine

Medical practitioners in the country have categorized the use of tea from decocted guyabano *(Annona muricata L.)* leaves as folk medicine.

Denounced in an October 2013 interview with a national newspaper as "scientifically unsupported alternative cancer treatment," a medical group has kept to its side of the fence.

However, did you know that traditional medicine, also called folk medicine or alternative medicine, has since been and still is being practiced the world over?

Comprised of knowledge systems that herbalists and/or divine healers have developed over generations within various societies, it traces its roots to the time before the era of modern medicine.

The World Health Organization (WHO) defines alternative medicine as "the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses."

In some developed countries like South Korea, China, and Taiwan their nationals jointly patronize their modern medicine and alternative traditional medical practices.

The South Korean government, for one, established a national school of traditional Korean medicine in 2008, more than 5,000 years after the establishment and use of ancient Korean medicine. Called the School of Korean Medicine, it is situated inside Pusan National University.

There are other Asian and African countries where up to 80 percent of the population relies on traditional medicine for their primary health care needs.

In fact, core disciplines, which study traditional medicine, include herbalism,

ethno medicine, ethnobotany, and medical anthropology.

The WHO cautions however that "inappropriate use of traditional medicines or practices can have negative or dangerous effects" and that "further research is needed to ascertain the efficacy and safety" of several of the practices and medicinal plants used by traditional medicine systems.

Thus, there is need to draw a line between alternative medicine and quackery.

Tracing the roots

So what is the buzz? What is the contention about this green, heart-shaped fruit with a waxy, leathery peel and soft, pliable spines?

It is, actually, about its decocted leaves, which many enterprising "herbalists" peddle as a cure-all, especially for the Big C.

Several groups have in fact exchanged words regarding their beliefs about guyabano's medicinal uses.

For cancer patients, their physical ordeal is made more difficult by the many doubts and aspersions casted by some quarters about their "natatanging gamot sa aking sakit (-- my only cure for my sickness)."

Thus, it might surprise some to know that a message by Dr. Gordon Cragg during the 38th Annual Meeting of the American Society of Clinical Oncology in 2002 stated that approximately 62 percent of commercially available drugs have in fact natural product origins.

Former chief of the Natural Products Branch of the National Cancer Institute Developmental Therapeutics Program in Bethesda, Maryland, Dr. Cragg championed the preservation and study of plants, since they are the source of chemical compounds that form the basis of many therapeutic drugs.

He said, "These natural products in fact play important roles as direct treatments, as templates, or as lead compounds that are modified for the treatment of human diseases."

He continued that the commonly known example from folkloric medicinal plants is the anticancer agent paclitaxol from Taxus brevifolia (locally known as Pacific yew or western yew) discovered by Wall and Wani in 1971. Treatment of advanced ovarian cancer now uses this.

Other examples of anticancer drugs derived from natural products include camptothecin from *Camptotheca acuminata* (happy tree, cancer tree, tree of life); podophyllotoxin from *Podophyllum peltatum* (may-apple); vincristine and vinblastine from *Vinca rosea* (periwinkle); and Adriamycin from the bacteria *Streptomyces peucetius.*

These have encouraged pharmaceutical chemists to search for new drugs from medicinal plant sources.

The latest to create such passionate debates is guyabano, a natural medicine containing acetogenins. A class of polyketide found in plants of the family Annonaceae, acetogenins specifically in *Annona muricata* have been cited by cytotoxicity (study of compounds toxic to cells) researchers, namely, Graver et al. (1992), Rieser et al. (1993), Li et al. (1994), and Alali et al. (1999), among others, as having potent anticancer properties.

Building the blocks

In 1997, Nicholas H. Oberlies, Vicki L. Croy, Marietta L. Harrison, and Jerry L. McLaughlin of the Department of Medicinal Chemistry and Molecular Pharmacology in Purdue University, Indiana published in the magazine Cancer Letters, results of their study entitled "Tumor cell growth inhibition by several Annonaceous acetogenins in an in vitro disk diffusion assay."

With the anti-cancer properties of acetogenins fully established, they worked on the capability of acetogenins to block, or inhibit cell growth of tumor cells. They tested these on several cell types in vitro (outside their normal biological context such as in glass or petri dishes) using cancerous cells from mice and humans as well as non-cancerous cells from the intestinal tract of rats.

Results showed that acetogenins applied to cancerous cells blocked their growth.

However, it did not affect non-cancerous and healthy cells and did not block their growth. These findings indicated that acetogenins selectively blocked cell growth of tumor cells, while keeping healthy cells unaffected.

Now those are certainly exciting and good news. Na Nena has reason to celebrate.

There have been more than 40 annonaceous acetogenins isolated from the stems, leaves, and seeds of guyabano.

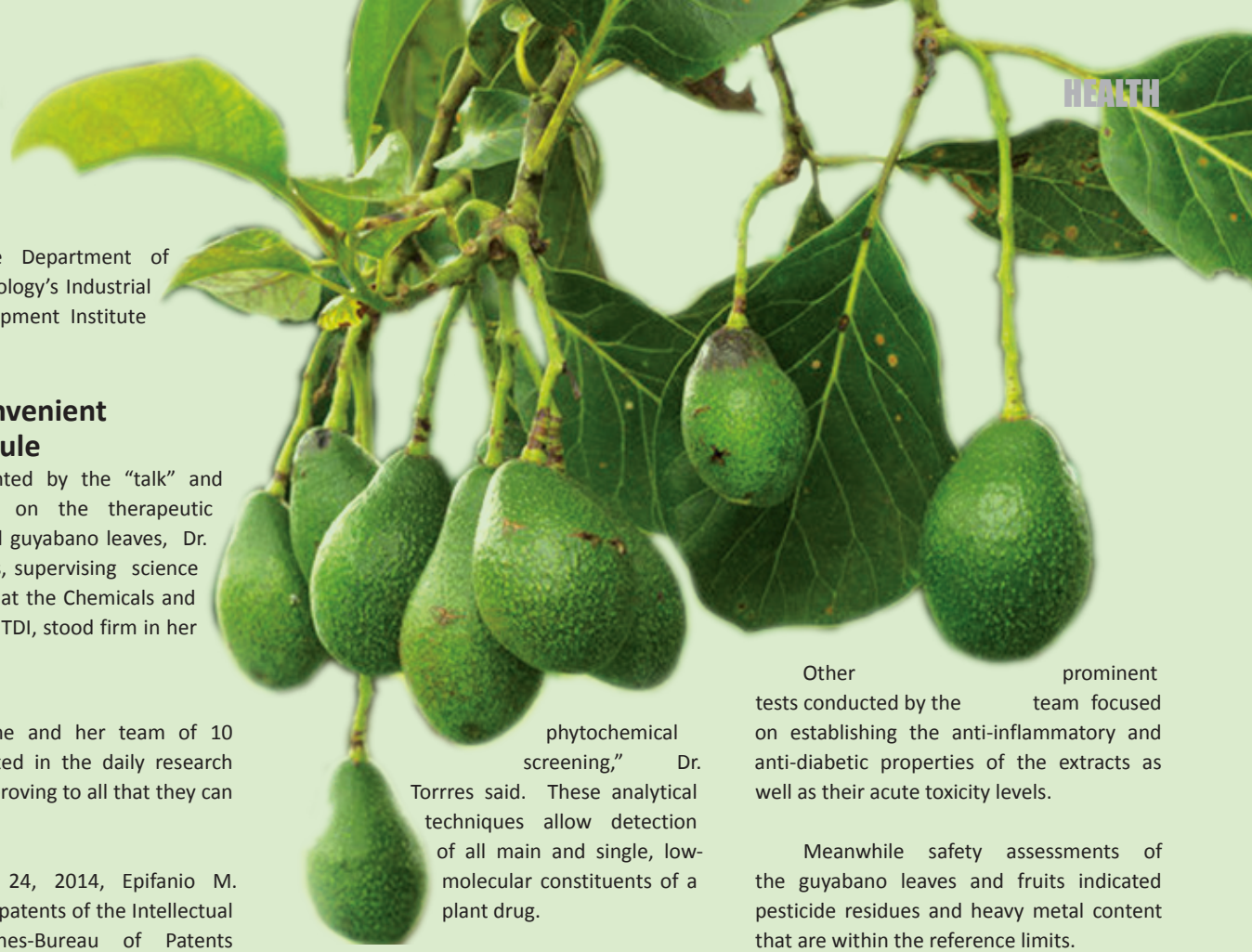
In the 1994 study of annonaceous acetogenins also from guyabano, Li et al. found three annonaceous acetogenins from the extract of the stem bark, namely, muricatin A, muricatin B, and muricatin C.

In those annonaceous acetogenins, four known compounds, muricatetrocin A, muricatetrocin B, corossolin, and corossolone, show special selective cytotoxicities against hepatoma (liver cancer) cell lines Hep G2 and Hep G2.2.15.

In 2007, Yang-chang Wu of Kaohsiung, Taiwan received US Patent No. 7223792 for his work on "Cytotoxic annonaceous acetogenins from *Annona muricata*," which include seven newly discovered pure compounds for curing human tumor. These are muricin A, muricin B, muricin C, muricin D, muricin E, muricin F, and muricin G.

However, documented efforts to produce large amounts of these active ingredients in the acetogenins of guyabano and subject these to clinical trials involving humans, have been few.

For the meantime, one can turn to the biological acetogenins found in the guyabano natural supplement in capsule and teabag



produced by the Department of Science and Technology's Industrial Technology Development Institute (DOST-ITDI).

Nature in convenient bag and capsule

Remaining undaunted by the "talk" and doubts of some on the therapeutic effects of decocted guyabano leaves, Dr. Rosalinda C. Torres, supervising science research specialist at the Chemicals and Energy Division of ITDI, stood firm in her belief.

For years, she and her team of 10 researchers persisted in the daily research chore until finally proving to all that they can do it.

On October 24, 2014, Epifanio M. Evasco, director of patents of the Intellectual Property Philippines-Bureau of Patents (IPP-BP), awarded Dr. Torres and her team Utility Model Patent Registration Nos. 2-2014000346 and 2-2014000347 for their work on the process of preparing guyabano leaves in capsule and teabag, respectively.

Her team members are Carmelita O. Manalo, Teresita S. Bonifacio, Evelyn B. Manongsong, Elvira L. Arrogante, Romulo R. Estrella, Eduardo A. Lanto, Cynthia N. Ochona, Yolanda C. Paras, Juliet T. Barcala, and Regin Glen Ortiz.

Two weeks later, IPP-BP again awarded the group with Utility Model Patent Registration Nos. 2-2014000307 for the process of preparing guyabano fruit in capsule, and 2-2014000308 for guyabano fruit in teabag.

The patent will allow the team to make, use, sell, or import the four utility models for the next seven years.

Following the WHO standard protocol, "We processed the fruits and leaves of guyabano and performed thin layer chromatographic fingerprinting and phytochemical screening," Dr. Torrres said. These analytical techniques allow detection of all main and single, low-molecular constituents of a plant drug.

"We did not stop there," she continued. "We went deeper and determined the potency of the extracts to inhibit microbial activities of the following disease-causing strains:

Staphylococcus aureus, bacteria that cause boils, impetigo, food poisoning, cellulitis, and toxic shock syndrome;

Escherichia coli, bacteria that can cause serious food poisoning;

Trichophyton mentagrophytes, fungal parasites that cause infection of hair, skin, and nails;

Candida albicans, a causal agent of oral and genital infections it has emerged as an important cause of illnesses and fatality in patients suffering from AIDS, undergoing cancer chemotherapy, and organ or bone marrow transplantation; and

Fusarium moniliforme, which can cause corneal ulcers."

Other prominent tests conducted by the team focused on establishing the anti-inflammatory and anti-diabetic properties of the extracts as well as their acute toxicity levels.

Meanwhile safety assessments of the guyabano leaves and fruits indicated pesticide residues and heavy metal content that are within the reference limits.

What's inside?

Past the green, waxy, leathery peel of guyabano is milky white, cottony flesh.

Dr. Torres' team, however, favored unripe fruits.

These contain flavonoids while the leaves contain tannins, fats and oils, unsaturated steroids and triterpenes, and flavonoids.

"We analysed the potency of leaf extracts against the control of edema (swelling) which may assist suffering patients. At 500 mg of guyabano capsule per kilogram of body weight, a patient may expect a 67 percent protection from swelling," she explained.

"What was so encouraging for us, though, were our findings regarding the anti-diabetic effects of the extract when compared against the positive control Metformin (a medicine used to control blood sugar levels in type 2 diabetics)."

Cautioning readers, she stressed, "There are certainly aspects of our research products that still need refining. Clinical trials are the next order of the project. Accelerated tests to determine the long-term effects of the same on microbial activity of cited microorganisms, as well as, their inhibitory properties against viruses, carcinogens, and allergens are also crucial."

Other wellness products

To date, Dr. Torres' team has developed other wellness products including essential oils used mainly for their aroma-giving properties. Through steam distillation, oil to be extracted from freshly harvested dried parts of aromatic plants like flowers of ylang-ylang and sampaguita, leaves of citronella, eucalyptus, and lemon grass, and calamansi rind, among others.

She elaborated that industry uses these in aromatherapy, "…for food and beverage processing, and in production of perfume, cosmetics, and other personal care products."

Another of their products is a slimming cream derived from caffeine from coffee grounds and grapefruit oil extract. It has significantly reduced weight, waist, and hip measurements, as confirmed by an eight-week clinical trial.

Meanwhile, two other research teams from ITDI have developed a candle-type ceramic water filter and a salt iodization machine.

Led by Dr. Blessie A. Basilia, head of the materials science division, local pottery makers now fabricate a candle-type ceramic water filter from clay, sand, and water.

It does not require electricity or batteries to operate. All one needs to do is pour water into the attached plastic container until full measure. The action of gravity naturally allows water to flow down into the catching pitcher below. The clay pot attached to the plastic container above the pitcher serves as filter.

"As a matter of order, drinking-water should be suitable for consumption, washing/ showering and domestic food preparation," said Dr. Basilia.

Piped in drinking water is the usual source of potable/ clean drinking water. However, drinking water may also be obtained from non-piped sources like springs and community wells.

"The control of contamination of drinking-water systems and sources by human feces or fecal contamination where it occurs is very important," Dr. Basilia stressed.

Tests conducted on water filtered via the ceramic water filter showed a heterotrophic plate count of less than 30, while coliform per 100 ml samples yielded negative results and tests for the presence of E. coli per 100 ml samples also yielded negative.

These mean that water filtered using the candle-type ceramic water filter passes the Philippine National Standard for drinking water.

Lastly, at the Chemicals and Energy Division, Dr. Anabelle Briones and her team developed a salt iodization machine.

A continuous screw-type, it can be used by small salt processors and help them comply with the ASIN Law otherwise known as Republic Act 8172, which promotes salt iodization nationwide.

It can also iodize fine or coarse salt and ensure consistent and even distribution of iodine content. The process is sustainable and employs low operating costs. (S&T Media Service)

PH hosts int'l tilt for the gifted in science

By FRAMELIA V. ANONAS
S&T Media Service, *DOST-STII*

THE PHILIPPINES will host an international competition for the gifted in science this June 13-18 in UP Los Baños. Dubbed the "5th ASEAN Plus Three Junior Science Odyssey" (APTJSO), the competition will have contestants from 13 countries vying for the top which, throughout the tilt's history, has been dominated by Philippine delegates.

The 5th APTJSO is a six-day education event that will allow gifted students from the Asia Pacific plus three other countries, namely Japan, South Korea, China, Myanmar, Laos, Thailand, Vietnam, Cambodia, Brunei Darussalam, Malaysia, Singapore, Indonesia, and the Philippines to interact with experts on climate science and put their scientific skills to test with their colleagues. Participating in the event are gifted junior high school students in science from said countries.

Contestants will hurdle three activities, namely: poster presentations, laboratory skills assessments, and group project presentation.

Meanwhile, the APTJSO is also a venue for teachers to share and experience innovations in teaching science and technology.

This year's theme, "Climate Change and the Rainforest," will anchor the competition's activities.

Started in 2010, the APTJSO is an annual educational event in the field of science and technology for young students between 13 to 15 years of age. This event is designed specifically to develop the gifted and talented young individuals in the field of science and technology (S&T) and to nurture future scientists and engineers.

Moreover, the competition aims to stimulate student's intellectual curiosity through various experience and experiments, and encourage and them to excel in S&T. Further, despite the highly competitive nature of the APTJSO, it actually provides students the opportunity to foster friendship and networking in the region.

The 5th APTJSO is a joint activity of the ASEAN+3 Center for the Gifted in Science and the Science Education Institute of the Department of Science and Technology in cooperation with the University of the Philippines Los Baños.

Use interactive materials to teach science and math, expert advises in DOST scientific conference

By ESPIE ANGELICA A. DE LEON
S&T Media Service, *DOST-STII*

TO BE globally competitive, the Philippines needs a critical mass of young people interested in science and math and the way to achieve this is by teaching those subjects using interactive materials.

Engr. Filemon T. Berba Jr., president of the Philippine Foundation for Science and Technology (PFST) emphasized this during the Department of Science and Technology-National Research Council of the Philippines (DOST-NRCP) Annual Scientific Conference and 83rd General Membership Assembly at the Philippine International Convention Center last March 16, 2016.

In his presentation at one of the break-out sessions titled "Innovative Strategies in Teaching Sciences to Filipino Students Towards Rapid Economic Growth and Global Competitiveness," Berba said that these young Filipinos with strong leanings in science and math make up the country's future pool of scientists, engineers, technology-based vocational workers, and other science and technology (S&T) professionals. Teaching science and math to them should make use of interactive materials starting in the elementary and high school levels. In this way, science and math teaching will be more effective.

Therefore, Filipinos must do away with the belief that science and math are difficult subjects, a mentality common in some places in the country, in order to start building a new breed of S&T workers.

He added that teachers should also upgrade their skills so that they will be more capable of effectively teaching these technology-oriented courses.

"Science and technology must empower workers, not replace labor. We have to develop a technical workforce," said Berba who was also a member of the DOST- Philippine Science High School System Board of Trustees.

PFST operates the Philippine Science Centrum, a DOST-accredited science foundation and the first science center-museum in the Philippines. It is home to 10 galleries, more than 150 interactive thematic exhibits, and is visited by 60,000-70,000 students and teachers every year.

PFST also operates six Traveling Interactive Science Centrums for elementary and high school students across the archipelago.

"When we expose children and adults to our interactive science exhibits, it stimulates their curiosity and it may lead to broader thinking and innovation," explained Berba.

Aside from the exhibits, PFST also organizes four to five Teacher Camps annually to train science and math teachers in the Philippines.

Free courseware helps upgrade Science and Math education

By ELMER C. PERAMO
S&T Media Service, *DOST-ASTI*

TWO TEACHERS, one from Quezon City and another from Tarlac, expressed their gratitude to the Department of Science and Technology (DOST) for a courseware that they deem very helpful in their teaching profession.

Meanwhile, another from Camarines Norte sent this message via the courseware's Facebook page: "Your courseware project will be very helpful to my nieces and nephew."

What courseware are they talking about?

The DOST's Advanced Science and Technology Institute (ASTI) has been developing Mathematics and Science courseware modules for elementary and high school students and teachers since 2006 with the support of DOST's Science Education Institute (SEI).

This Courseware Project (http://courseware.dost.gov.ph/) aims to make math learning more accessible to students and help math teachers find ways to teach the subject in a more effective way. In so doing, the courseware serves to upgrade and improve science and math education in the country by enabling schools to take advantage of Information Technology (IT) in conducting streamlined classroom lectures in a cost-effective way. As a result, students become more competitive.

"The coursewares make full use of information technology to aid our classrooms and teachers in enriching the students' learning environment in science and mathematics," said DOST Secretary Mario G. Montejo. "These tools are developed by Filipinos for Filipinos, hence teachers no longer have to use foreign materials. The platform used in the coursewares is very appropriate for today's students whose interest are into computers and information technology."

The science and mathematics courseware modules are provided for free to public schools and are also made available as online resources.

For this end, ASTI created a website in 2014 primarily to have a venue where Filipinos can download the modules for free. All the completed modules have been compiled and the relevant ones uploaded to the DOST Courseware website. These modules have already been reviewed and tested through the collaboration of ASTI, SEI, and UP's National Institute of Science and Mathematics Education by conducting user-acceptance tests in several schools nationwide.

The website also archives project-related news articles and houses a photo gallery of students and teachers using the courseware in their schools. Based on statistics from the backend side of the DOST Courseware website, more than 15,000 downloads have already been registered as of this writing.

The courseware developers from ASTI also tapped social media to raise awareness and promote the courseware website. In less than a month, the DOST Courseware Facebook page (https://www.facebook.com/Courseware.DOST/), already had 300 Facebook likes. The majority of the site's visitors are teachers, students, and parents, some of whom have expressed their satisfaction over the courseware and how it helped them do their jobs better as science and math teachers.

STARBOOKS saves Bataan and Marikina schools

By ESPIE ANGELICA A. DE LEON AND ROMELIE JANELLE MARANAN
S&T Media Service, *DOST-STII*

DOST-STII and DOST-NCR personnel with Marikina Polytechnic College officials, faculty members and students.

TWO SCHOOLS in Bataan Province with no Internet connection and another school in Marikina whose library fell victim to calamities are the newest proud owners of the Department of Science and Technology's (DOST) internationally acclaimed STARBOOKS.

STARBOOKS or the Science and Technology Academic and Research-Based Openly Operated Kiosks, the country's first science digital library developed by experts from DOST- Science and Technology Information Institute (STII), is a standalone information source containing thousands of digitized local and foreign science and technology (S&T) resources.

Its latest beneficiaries are two satellite campuses of the Bataan Peninsula State University (BPSU) in the third-class municipalities of Bagac and Abucay where there are no landlines and Internet connection, and Marikina Polytechnic College (MPC).

BPSU's Bagac campus, composed of 200 students, does not have a library for its elementary students. Meanwhile, its high school department has a library but with limited resources.

"Children today need quick access to information. So we really need this in our campus since we have no Internet connection because of our school's remote location," said Marieta G. David, college librarian at the Abucay campus. "They no longer have to go to town to use the Internet for their research, especially for their subjects in agriculture, fisheries, agro-forestry, and others."

Bagac campus librarian Rowena R. Mamangon agreed. "Internet connectivity is a problem in our place. So I believe STARBOOKS will be of great help not just to our students but also to the entire community. They, including those who want to do business, can access materials such as livelihood videos," she said.

According to DOSTs' Provincial Science and Technology Director for Bataan Rosalie V. Ona, it is DOST's aim to upgrade students' research resources and capabilities and improve their knowledge in science and math since these are among their waterloo.

Marieta G. David, college librarian at the Bataan Peninsula State University (BPSU) Abucay campus, samples STARBOOKS during the orientation and training on how to use the STARBOOKS at the BPSU Main Campus in Balanga City, Bataan last February 2, 2016.

STARBOOKS also proved to be a big help to MPC.

During the height of Typhoon Ondoy in 2009, most of the school's properties were washed out. It will be remembered that Marikina City was one of the most affected areas during the typhoon.

Five years after recovering from the effects of Ondoy, the library caught fire last December 23, 2014, turning thousands of textbooks, undergraduate theses, reference materials, local and international magazines, campus publications, 50 desktop computers, study tables and chairs, trophies, personal documents, and other valuable historical items, into ashes. The cause of fire is still under investigation today.

After the tragedy, the school received assistance and donations from different institutions including University of the East, San Beda University, De La Salle University, Ateneo de Manila University, University of Asia and the Pacific; the local government unit; private citizens; alumni; and current students.

"We really struggled a lot. We were able to rise back from our bad experience with Ondoy, wherein we were able to bring back the number of our book titles to 6,000 plus. But then the fire came and lost everything again, as in zero," Dalit said. "But thank God for helping us and giving us the people, who assisted us to get back on track, especially DOST for our new STARBOOKS unit."

MPC-OIC President Dr. Virginia D. Bacay considers themselves lucky for having DOST's STARBOOKS at this point in time. "Maybe we should be happy that we did not get hold of this technology earlier because it might have burned down as well," she said.

The STARBOOKS turnover and hands-on orientation cum training sessions conducted by DOST-STII were held last February 2 at the BPSU Main Campus in Balanga City and February 23 in MPC. The orientation and training sessions were meant to acquaint the schools' library and IT personnel with STARBOOKS, recipient of the 2015 Outstanding Library Program of the Year Award by the Philippine Association of Academic and Research Librarians.

From STARBOOKS to SuperSTARBOOKS

Meanwhile, DOST-STII has raised the bar of excellence a notch higher and developed the SuperSTARBOOKS.

A highly enhanced version of the first STARBOOKS, SuperSTARBOOKS carries more information, videos and tutorials on S&T subjects and topics which students can get for school and personal research.

Inside this knowledge portal are 411 interactive coursewares in general science and mathematics developed by the DOST-Science Education Institute. There are 94 animated teach-in modules that will surely be very interesting to kids in the elementary grades dubbed Science for Kids-Make Me Genius. Some 354 Powerpoint presentations of the Make Me Genius series feature 1,075 cool science facts that will definitely pique the imagination and creativity of kids.

Also enriched with information materials from the former Technology Resource Center (TRC) of the DOST, SuperSTARBOOKS now carry 8,000+ full text materials and 295 livelihood videos that will be of i75nterest to entrepreneurs and hobbyists. Because TRC is a repository of how-to videos, the SuperSTARBOOKS now has a wide variety of micro and small business ideas, with step-by-step tutorials which are easy to understand and follow.

Also incorporated into the SuperSTARBOOKS are links to websites with rich science and technology content like the www.neok12.com that contains 177 videos about earth and space, 292 videos on life science, 162 videos on physical science, 189 videos on social studies, and 92 videos about the human body. Furthermore, there are 62 videos that can be viewed on the www.freesciencelecture.com website.

STII has deployed more than 790 STARBOOKS units since its launching in 2011. STARBOOKS was among the four recipients of the American Library Association Presidential Citation for Innovative International Library Projects last June 2015 in San Francisco, California. It was also featured during the Kuala Lumpur Engineering Science Fair last October 30- November 1, 2015 in Malaysia.

For inquiries, email dost.starbooks@gmail.com, starbooks@stii.dost.gov.ph or stiilibrary@gmail.com (S&T Media Service)

UP CLOSE: Outstanding Young Scientists in 2015

The Outstanding Young Scientists (OYS) award is given to young Filipinos who have made significant contributions to science and technology.

Mandated to recognize outstanding achievements in science and technology and to serve as a reservoir of competent scientific and technological manpower for the country, the National Academy of Science and Technology Philippines (NAST PHL) recognized distinguished Filipino scientists and outstanding publications during NAST's 37th Annual Scientific Meeting.

Here's a peek into the minds and hearts of young scientists who measured up to what the Academy is looking for among our young scientists.

"It may not be the Nobel Prize award in chemistry, but in a country where chemistry is less popular, it gives recognition to the passion that I have been giving to science all the way from childhood."

Dr. Allan Peter G. Macabeo

DR. ALLAN PETER G. MACABEO: FINDING PHARMACEUTICALS IN LOCAL MEDICINAL PLANTS

By DIANARA D. ANGELES
S&T Media Service, *DOST-STII*

Getting the title"Outstanding Young Scientist" was an unexpected moment for the 37-year-old Dr. Allan Peter G. Macabeo. He recalled that he learned about the great news through a phone call from the National Academy of Science and Technology (NAST) Awards committee staff while he was attending their department planning and assessment seminar. An e-mail soon followed.

Dr. Macabeo's endless determination and hard work in the field, which he is most passionate about, paid off upon receiving the recognition and loads of heartwarming congratulations from relatives, friends, colleagues, classmates in high school and college as soon as the result was posted in the Outstanding Young Scientists Inc. (OYSI) Facebook page.

Dr. Macabeo was hailed as Outstanding Young Scientist in Chemistry by NAST. He was recognized for his important research contributions on the sustainable use and development of biologically active natural products from Philippine medicinal plants and sugar-biomass to find novel, promising pharmaceuticals, and innovate synthetic methodologies en route to relevant chemical intermediates both for drug discovery and academic purposes.

According to him, their study helped validate, among others, the potential of endemic Philippine medicinal plants as source of phytochemicals to fight fast- and slow-growing Mycobacterium tuberculosis, a bacterial species that causes most cases of tuberculosis.

Dr. Macabeo said that he was humbled by the award and profoundly appreciative of being recognized in such way. "It may not be the Nobel Prize award in chemistry, but in a country where chemistry is less popular, it gives recognition to the passion that I have been giving to science all the way from childhood."

He also believed that the NAST OYS and TWAS awards in chemistry are the crowning glories for the hard work of his very motivated research group.

"It will provide more opportunities for collaboration thus resulting to intellectual companionships for my own research. With increased network capability, findings in my research group can be disseminated more widely. In addition, it increases my credibility to carry out independent research and gain approval for funding opportunities."

He also encourages the government to continually support this kind of recognition for it motivates young Filipino scientists to become better in their field.

Dr. Macabeo obtained his Bachelor's Degree and Master's Degree in Chemistry from the University of Santo Tomas in 1999 and 2003, respectively, where he graduated magna cum laude. In 2011, he earned his Doctor of Sciencei n Organic Chemistry Degree Magna Cum Laude from the University Regensburg in Germany.

Moreover, he is currently an associate professor of chemistry at the University of Santo Tomas, an associate editor of the National Research Council of the Philippines and a member of the international editorial board of several journals in pharmaceutics, chemistry, and biology.

PINNING DOWN PATHOGENS

By MA.LOTUSLEI P. DIMAGIBA
S&T Media Service, *DOST-STII*

Dr. Dennis Villaseñor Umali is a pioneer. As of press time, he is the only person specializing in the field of Veterinary Molecular Epidemiology in the Philippines. Umali is a faculty member of the Department of Veterinary Clinical Sciences, College of Veterinary Medicine in the University of the Philippines Los Baños.

Epidemiology is said to be the cornerstone of public health that pursues insights on the causes, distribution, and prevention of diseases in the population. However, Molecular Epidemiology is a relatively a new branch of epidemiology -- it uses methods of molecular biology to study health and disease in populations.

Dr. Umali said that "my job is to study livestock and poultry diseases at the molecular level. We study the DNA/RNA (deoxyribonucleic acid / ribonucleic acid) of veterinary pathogens so that we can pinpoint the exact source and cause of any disease outbreak." Pathogen is an infectious agent that causes disease to its host.

"By using their DNA/RNA, we can know the mechanism on how veterinary pathogens cause a disease, on how they mutate and on how they are being transmitted from hosts to hosts and farms to farms. By knowing these information, we can design ways on how to prevent the spread of diseases and on how to treat animals more effectively and more efficiently," Dr. Umali explained.

Dr. Umali and his co-workers have performed molecular characterization of several economically important pathogens, such as Newcastle Disease Virus, Salmonella, Ornithobacterium, Rhinotracheale, and Leucocytozoon, among others.

His team was able to perform the first complete genome sequencing of Newcastle Disease Virus in Japan. Globally, Newcastle Disease is a highly dreaded poultry disease and one of the biggest contributors of economic losses to the poultry industry.

With this research, his team was able to generate useful references in characterizing disease outbreaks at the molecular level and be used as a genetic map for future investigations with regards to vaccine designs and development of molecular diagnostic tools.

Even so, Dr. Umali admitted that his field of study may sound like "alien" at present. "My field seems like a science fiction but this is the new trend especially in advanced countries."

According to Dr. Umali this field of study is rarely done in the Philippines. "My purpose in life right now is to spread these new technologies to our local farmers and to the Philippine veterinary industry as a whole. If we will be able to have access to these new technologies, we will be able to diagnose diseases easily, more rapidly, and accurately."

"As a result, we will be able to select the most appropriate, economical and more effective drugs and vaccines to use and we will be able to increase farm production thereby increasing the income of our farmers. In the long term, application of these new technologies may contribute in ensuring food sufficiency in our country. It may also bring food prices down so that we will have adequate and affordable food for the masses," he added.

With his passion for research and development, Dr. Umali was recognized as one of the 2015 Outstanding Young Scientist Award given by the National Academy of Science and Technology under the Department of Science and Technology with his research contributions on the molecular characterization of economically important poultry pathogens not just in the Philippines but also in the world.

"The award is significant in that it serves [as] an affirmation that the work I am engaged in is recognized and appreciated by colleagues in the local scientific community," said Dr. Umali.

Dr. Umali expressed his gratitude and shared that the government, and if possible the private sector, should continue to support these kinds of award.

"Investing in our scientists is an effective way to enhance the level of science and technology in our country. And a high level of science and technology is one of our keys to become a first world country," Dr. Umali added.

Dr. Dennis V. Umali (left) and with teammate Mr. Takashi Watannabe after a basketball tournament in Japan.

CERTAINLY NO OFF-FLAVOR FOR THE OYS AWARD

By DIANARA D. ANGELES
S&T Media Service, *DOST-STII*

Dr. Rex Ferdinand M. Traifalgar, named as one of the recipients of the NAST 2015 Outstanding Young Scientists, shared his secret ingredients in creating his important contributions to Fisheries Science in the country. He was chosen as one of the awardees of the Outstanding Young Scientist (OYS) Award by the National Academy of Science and Technology, Philippines.

"Being a good listener, observant and proactive is my strength that helped me to have this award, " he revealed.

Having a heart for the people, Dr. Traifalgar admitted that his scientific outputs were generated through his boundless effort to be the ears by listening to the problems of the farmers, the eyes for directly observing the industry situation, and the brain by formulating proactive science-based approach to solve the problems resulting to the enhancement of the overall productions in the field of fisheries and aquaculture.

For him, the OYS award is the general reflection of the government's serious intentions to promote a science-based economy and country. The awards function as government's recognition and expression of gratitude to the efforts and hardships of its scientific constituents who have performed their best in an overall goal of constructing a prosperous Philippines.

Dr. Traifalgar perceived that the award would, by some means, open first-hand opportunities, specifically chances on research and development concerning issues affecting the overall fish fabrication of the country.

His outstanding research contributions to the development of gas chromatography mass spectrometry detection method in detecting the off-flavor compounds in milkfish, cultured water, and bacteria from Laguna Lake gained the judges' nod for him.

Moreover, Dr. Traifalgar spearheaded the research works on the classification and identification of bacterial species that cause off-flavor in milkfish. The study will greatly benefit fishermen within the vicinity of Laguna Lake.

"As a science-oriented person, usually we do our tasks without the intention to win an award but we do our tasks based on the need of the country to propel its economic growth, sustainability and to attain the overall goal of national prosperity through science," Dr. Traifalgar humbly said.

Showing his eagerness and determination for the improvement of fisheries and aquaculture, he shared his two ideas for the development of the field and the society.

First is the generation of more science information through research and discovery that would serve as a foundation of knowledge in the development of technology and overall goal of sustainability and improvement of industrial production.

Second is by mentoring the young generation through educating, training, and imparting to them the basics of scientific knowledge and practice because he has this concept that mentoring could lead to the increase in numbers of science-oriented persons all over the country that would serve as building blocks of progress.

Dr. Traifalgar obtained his Baccalaureate Degree in Inland Fisheries and Master's Degree in Aquaculture at the University of the Philippines Visayas in 1995 and 2005, respectively. In 2009, he received his Doctorate Degree in Fisheries Science with specialization in Nutritional Immunology from Kagoshima University, Japan.

Currently, he is actively involved in research activities and projects that intend to develop technology to improve aquaculture production through the science of nutrition, physiology, and immunology. In addition, he is involved in studies concerning the optimization of high-density larval rearing, application of flow through system in larval rearing, larval diet enrichment and physiological and nutritional understanding of larval head deformities, algae-based immunostimulant for mud crab and shrimp, and plant-based protein from aquatic plant as feed ingredient and control of Vibriosis in shrimp culture.

Science and Technology Ambassador: A Catalyst for National Progress

By ROD KENNETH V. LUBONG
Camarines Norte State College

SCIENCE AND technology play a vital role in the development of the nation, and it is through the DOST scholars that the aim of the millennium development goal can be achieved. Scholars are expected to be imbued with all the essential and efficient scientific and technological learnings that will be a great tool as the near future is expected to be a challenging era.

Through the years spent in learning, DOST scholars have gained not only scientific knowledge but also the methods by which these learnings can be extended to the community. The extension services are somewhat important for building a resilient community, which will form part of a progressive nation. Furthermore, as DOST scholars, they have engaged in varieties of scientific expositions and exhibits, as well as research colloquiums, which have enhanced their learnings. Attendance of different science fora and seminars, with great atmospheres for learning, are likewise experienced by scholars.

Inspired by all the privileges they have acquired as scholars, DOST scholars are motivated to pursue their studies harder so as not to meet any academic deficiencies. However, something greater that inspires the scholars is the fast-growing economy of the nation in which in the near future they offer themselves to contribute to. Since they are funded by the government, the scholars are set to serve the nation for a stable human resource and for a greater development of science.

Converting their learning experiences into resources for nation development, it is certain that the nation will build up a strong and stable economy. Continuous scientific and technological researches mean sustainable development. Engaged by various learning experiences, inspired by the economic growth of the nation, and pushed to convert these learnings into a firm contribution for national progress and development, these make the DOST scholar a well deserving Science and Technology (S&T) Ambassador.

As an S&T Ambassador, it is very important to uphold the importance and maximum utilization of science and technology. It shall be the ambassador's commitment to generate new scientific and technological ideas and learnings and expound it, making sure that the society makes use of it and benefit from it. The ambassador shall make trails by which the science and its application approach the society and be felt by the community to ensure progress. If science and technology benefit everyone, regardless of their age and gender, their standard of living will be uplifted.

Moreover, an Ambassador encourages the entire nation, particularly the students, for a comprehensive participation in the enrichment and dynamic evolution of a scientific learning.

In the near future, ASEAN Integration is set to be gradually implemented. As an ambassador, the S&T scholar shall make sure that the trends, tenets, and competencies brought by this other challenge be comprehensively treated, putting into priority the progressive formation of science and technology.

Another important thing is to create linkages to different sectors beneficial to our aim of developing science and technology. This linkages are intended to facilitate collaborations and exchange of ideas which in return will increase our science resource.

With all the challenges for our national progress, it is necessary that a science and technology ambassador be equipped with all the attributes appropriate. A DOST scholar with proven resilience and academic excellence fits the job.

Editor's Note:

This essay won first place during the Scholars' Summit at the Science Nation Tour held in Legazpi City, Albay on March 3, 2016. The essay topic was "The DOST Scholar as S&T Ambassador." This copy is a shortened version, with very minimal editing.

Movie Review

"Concussion"

By ESPIE ANGELICA A. DE LEON
S&T Media Service, DOST-STII

Science reportage aims to simplify and break down science and technology (S&T) news and issues into interesting and easy-to-digest bits of information that people outside the science community can understand.

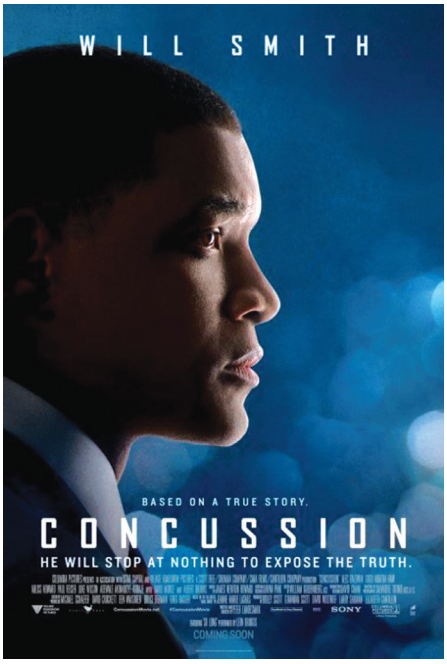
Interestingly, a recent movie has likewise done its share in laymanizing science facts – medical information in particular – to make it more appealing to its viewers including those outside the medical community.

The film is "Concussion," written and directed by Peter Landesman and based on the true story of Nigerian forensic pathologist Dr. Bennet Omalu, superbly portrayed by Smith. Omalu was the first to discover the condition called chronic traumatic encephalopathy (CTE).

According to Boston University's CTE Center, CTE "is a progressive degenerative disease of the brain found in athletes (and others) with a history of repetitive brain trauma, including symptomatic concussions as well as asymptomatic subconcussive hits to the head. This trauma triggers progressive degeneration of the brain tissue. These changes in the brain can begin months, years, or even decades after the last brain trauma or end of active athletic involvement. The brain degeneration is associated with memory loss, confusion, impaired judgment, impulse control problems, aggression, depression, and progressive dementia."

Omalu discovers CTE when he performs an autopsy on Mike Webster, former Pittsburgh Steelers center, who unexpectedly died after battling cognitive and intellectual impairment, mood disorders, and depression. The autopsy finds Webster as having suffered from severe brain damage as an effect of playing football where players frequently collide, causing heads to smash against the ground or against each other.

He later discovers that other deceased former National Football League (NFL) players namely Terry Long, Justin Strzelczyk and Andre Waters, had similar symptoms. Eventually, Omalu



with the help of former Steelers team doctor Dr. Julian Bailes, fellow neurologist Steven T. DeKosky ,and county coroner Cyril Wecht, publishes a paper about CTE. Unfortunately, the NFL for whom professional football spells big business, turns a deaf ear to this discovery and pressures him to stop spreading the word about CTE, thus forcing Omalu to navigate the rough terrain involved in bringing the medical issue out into the open.

What is so striking is how the narrative pulls the non-doctor into the story. Two scenes stand out. One scene explains CTE in descriptive terms and with the use of a bottle, providing a crystal clear picture of the brain when two players smash into each other. In the second scene, Omalu explains CTE to colleagues with a discussion of birds.

His explanations use layman's terms adequately to make his listeners understand CTE - its causes, symptoms, and what exactly happens to the brain when the head is subjected to repeated blows. Certainly, this is an example of popularized science.

Another factor that engages the viewer is how the plot unfolds to show how sports is closely linked with medicine and how this can cause friction with money-making machines such as professional football. Throw in the social issue of racial discrimination and truly, Dr. Bennet Omalu is in for an uphill battle.

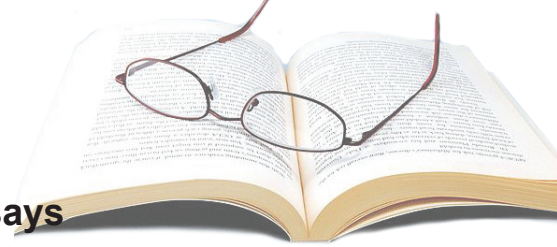
Dr. Bailes and Dr. Omalu speak out

In an interview with the Chicago Tribune shortly before "Concussion" opened in US theaters in December 2015 (http://www.chicagotribune.com/news/ct-concussion-movie-chicago-doctor-met-20151223-story.html), the real Dr. Bailes, portrayed in the film by Alec Baldwin, reveals, "Our studies of former NFL players were showing they were having more cognitive problems and dementia than they should have. But it wasn't until 2005, when the Mike Webster case was reported, that we had the first brain that had these changes, which definitively diagnosed this condition."

In an interview with TIME magazine also last December (http://time.com/4158140/concussion-film-bennet-omalu-cte-nfl/), the real Dr. Omalu states that like Alzheimer's, CTE can be diagnosed in a living person. "But now we, as pathologists, need more objective measures because symptoms, to a certain degree, are subjective," he stresses. "We need markers - biochemical markets, radiological markers. But we should also realize that radiological markers, biochemical markers wouldn't give 100 percent degree of certainly. It is not an absolute science."

Such is the intrigue and wonder of this branch of science called medicine. And through a Hollywood movie titled "Concussion," all the more that medicine's controversial and provocative nature is brought into the fore.

S&T Post welcomes contributions for our Movie Review section. Please email your contributions to eadeleon.dost@gmail.com. Reviews should tackle the movie's science and technology component, subject to the approval of the Executive Editor. For inquiries, call 837-2191 local 107 and look for Gigi de Leon.



How to Travel with a Salmon and other Essays

By ROMELIE JANELLE MARANAN
S&T Media Service, DOST-STII

There is something about Italian writers that causes their readers to be hooked on their books. One of them is the late Umberto Eco, world-renowned semiotician, essayist, literary critic, philosopher, and novelist - definitely a clever man who knows how to play with words and take bookworms on an enchanting romp through the ways of life.

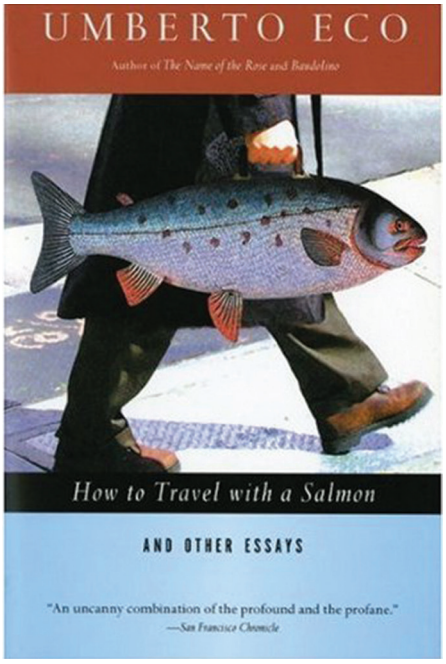
Among his bestselling books is How to Travel with a Salmon and other Essays, a collection of short essays originally published in Italian in 1992 and first translated into English in 1994. Most of the essays were written during the late '80s and early '90s. Eco called them diario minimo or minimal diaries - selected among the crammed pieces in his desk drawer and collected for the book.

Parodical, satirical and whimsical, How to Travel with a Salmon and other Essays talks about our post-modern life and every reader can relate to the stories.

In particular, Eco talks about technologies a lot in this book. In How to Buy Gadgets, Eco mentions modern technologies such as the "Omniblanket," an electric blanket that can be programmed to alter its temperature for your body; the "Snorestrooper," a kind of wristwatch that controls a person's snoring; "Pulse-Trainer" which lets a person go jogging until the gadget tells him he has to stop jogging; "Bio/Bet," a device that kills dog fleas; a personalized and sterilized headset that lets you listen to different music, perfect for travelers with a pathological fear of AIDS; and a lot more.

Almost predicting the future of inventions and technologies, Eco reminds us that the more these technologies develop, the more that these gadgets become too complicated and fancy, rendering them useless at times. Hence, Eco tells us that we should be cautious about them.

He also discusses the fax machine and portable cellular phone. During the time the essays were written, these machines were among the biggest achievements since they



made people's lives easier. Yet, in "How Not to Use the Fax Machine," and "How Not to Use the Cellular Phone," Eco stresses that people should not be enslaved by these kinds of technologies and should only use these when needed.

While most of the essays are clichés of contemporary life, they still offer a lot of lessons that readers should remember. In "How to Travel on American Trains" for example, he highlights that it is not good to travel on air if you have colds as it can do more harm to your body system.

Likewise, Eco wittily imparts very important reminders in the essay "How to Avoid Contagious Diseases." He gives different scenarios people from various sectors commonly find themselves in, where diseases can be obtained. Like, for drama critics, Eco suggests avoiding Off-Off Broadway theatres in New York because it is a known fact that English-speaking actors spit most of the time. Off-Off Broadway theaters are smaller than Broadway with fewer than 100 seats.

Eco also says that swimming in oil-polluted sea may cause infection due to the saliva particles of other swimmers who have spat the polluted water since it will be carried around by the oil droplets. He likewise explains how germs can enter the respiratory channels of those who smoke 80 Gauloises a day (a French brand of cigarette). As for ethnic minorities and inhabitants of the Third World, Eco notes that these people who suffer from endemic famine must try not to swallow often because their saliva can contaminate their intestines since it was exposed to the foul air of their surroundings.

Some of these essays are parodic fantasies using non-human characters, reminding readers of fellow Italian Italo Calvino. Among these is the story about the future with intergalactic stuff and his intriguing yet funny view on maps in 1:1 scale.

In some ways, readers may also remember the famous Filipino author Bob Ong while reading Eco because of his style of writing. Most people today find humorous satires and parodies very interesting, maybe because though they are very funny, they also picture reality and provoke us to think about real life. Instead of giving critical remarks about the issues of society, Eco chooses to address them with wit, but with discretion.

Although the essays are relatively short, the readers must be careful in perusing the stories because Eco's writing style is very complex and dense. Considering that he is an expert in communication, expect that at some point, the stories are very hard to absorb so it might serve you well to put your dictionary beside you while reading, just to be sure.

How to Travel with a Salmon and other Essays is a 248-page book, perfect for the young and not so young, who are looking for something new and relatable.

S&T Post welcomes contributions for our Book Review section. Please email your contributions to eadeleon.dost@gmail.com. Reviews should tackle the movie's science and technology component, subject to the approval of the Executive Editor. For inquiries, call 837-2191 local 107 and look for Gigi de Leon.

Former DOST exec is now NPC's Commissioner. Former Department of Science and Technology (DOST) Assistant Secretary for Climate Change and Disaster Risk Reduction, and Officer-in-Charge of DOST-Science and Technology Information Institute Raymund E. Liboro has been appointed as the first Commissioner of the National Privacy Commission (NPC) under the Office of the President. Commissioner Liboro took his oath of office before DOST Secretary Mario G. Montejo last March 7, 2016. NPC will be in charge of administering and implementing the provisions of the Republic Act No. 10173, otherwise known as the "Data Privacy Act of 2012, the law that will protect individual personal information in information and communications systems in the government and private sector. Commissioner Liboro has been with DOST since 2010 and is recognized as among the prime movers of some of DOST's flagship projects including Juan Time, Project NOAH, Science for Safer Communities, Building Back Libraries, STARBOOKS, and Science Nation Tour, among others

Fairness opinion experts. The Department of Science and Technology -Technology Application and Promotion Institute Director Edgar I. Garcia (third from right) welcomes the members of the newly created Fairness Opinion Board (FOB) under the Chemical and Food and Beverage Industry that will review and give its opinion regarding the various licensing agreements and spinoff terms that DOST research and development institutes will enter in the future. The FOB consists of experts in particular industries, scientists, and patenting practitioners. Photo includes members of the FOB (from left seated) Atty. Anne Mariae Celeste V. Jumadla, Revo IP Mente; Dr. Marissa V. Romero, Philippine Rice Research Institute; Atty. Edmund Jason Baranda, Baranda and Associates; Ms. Maria Divina D. Alcasabas, Technology Plus Products & Services Consultancy, and Mr. Noel A. Catibog, DOST-PCAARRD. Also in photo are the members of the secretariat (L-R) Ms. Rose Marthy B, Bongon, Atty. Marion Ivy D. Decena, Mr. Caezar Angelito E. Arceo, and Engr. Richelle D. Cahanap. **(Photo by Gerardo C. De Jesus, S&T Media Service, DOST-STII)**

Doppler Radar in Iloilo. DOST Secretary Mario G. Montejo (4th from left) unveils the marker on the new PAGASA Iloilo Weather Station where the Doppler Radar is installed. Doppler radar is a sophisticated weather equipment for data gathering on rainfall amount in specific areas in a certain period of time and detect rain clouds important in cloud seeding. Assisting Secretary Montejo is Iloilo Governor Arthur Defensor Sr. who lauded the project as very valuable in providing weather information to the people in times of calamities. **(Photo and Text by Rodolfo P. de Guzman/S&T Media Service)**

Certificate of Ownership. Department of Science and Technology Secretary Mario G. Montejo awards a Certificate of Ownership to Rudy M. Caoagdan, owner of RC Agribusiness Center based in North Cotabato. The certificate validates that Caoagdan, along with other awardees, have fully paid his loan granted through DOST's Small Enterprise Technology Upgrading Program (SETUP). The program assists micro, small, and medium enterprises via a package of assistance, including loans that come in the form of technology upgrading. Other SETUP clients issued certificates of ownership are Kablon Farms in Tupi, South Cotabato; Carpenter Hill Gardens in Koronadal, South Cotabato; Tecuala Mini-Sawmill and Woodworks in Old Kidapawan, North Cotabato; Rafol's Machine Shop and Engineering Services in General Santos City; and NCV Workshop in North Cotabato. The awarding is part of the Science Nation Tour, a national roadshow that aims tomake communities "feel" science through various activities relevant to different sectors of the society. Held last February, the roadshow featured launches of various projects, visits, fora, technology demonstration, inventors' contest, exhibits, and others.With Sec. Montejo are DOST XII Regional Director Zenaida P. HR Laidan (leftmost) and DOST Asst. Secretary for Countryside Development Urdujah A. Tejada. **(Photo by Gerardo G. Palad/Text by Framelia V. Anonas, S&T Media Service)**